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GOVERNMENT REPORTS

Announcements & Index

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U.S. DEPARTMENT OF COMMERCE Philip M. Klutznick, Secretary of Commerce
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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 23 November 7, 1980

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*Committee on Scientific and Technical Information

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NTIS

You can use the Edge Index on the outside back cover to locate the beginning of each category within the Reports Announcements section.

Category 1. Aeronautics

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Subcategories:Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

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Category 7. Chemistry

Subcategories: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

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Category 9. Electronics and Electrical Engineering

Subcategories: Components; Computer; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

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Subcategories: Conversion Techniques; Power Sources; Energy Storage.

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Subcategories: Adhesives and Seals; Ceramics, Refractories,and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

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Subcategories: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recor Devices; Reliability; Reprography.

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Category 17. Navigation, Communications, Detection, a Countermeasures

Subcategories: Acoustic Detection; Communications; Direction Finding; Electromagnetic a Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigat and Guidance; Optical Detection; Radar Detection; Seismic Detection.

Category 18. Nuclear Science and Technology

Subcategories: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear strumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes a Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reac Physics; Reactors (Power); Reactors (Non-power); SNAP Technology.

Category 19. Ordnance

Subcategories: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Exp sions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underw Ordnance.

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REPORTS ANNOUNCEMENTS

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The full bibliographic report entries in this section are arranged by subject category and subcategory. Within each subcategory the reports are arranged alphanumerically by NTIS order number; the Ebcdic character set sort is used.

SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A087 027/9 PC **A03**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab

A Spline Relaxation Procedure for Calculating Axisymmetric Flow Fields about Body/Propeller Combinations. I. Frozen Vorticity and Potential Flows.
Technical memo.,
G. H. Hoffman. 14 May 80, 49p Rept no. ARL/PSU/TM-80-108
Contract N00024-79-C-6043

A general numerical solution method is presented for calculating incompressible axisymmetric viscous/turbulent flow in the tail-near wake region of a body-propeller combination. The method makes use of the parabolic vorticity transport approximation in conjunction with polynomial splines to achieve sufficient accuracy in high flow gradient regions with as few grid points as possible. A sheared body fitted coordinate system is used and the numerical solution of the finite difference equations is obtained by standard line overrelaxation. This report presents the details of the method for the first phase of the work where the vorticity transport equation is omitted (frozen vorticity flow). Sample potential flow and frozen vorticity solutions are presented with no propeller present. (Author)

AD-A087 134/3 PC **A05**/MF **A01**
Nielsen Engineering and Research Inc Mountain View CA
Basic Studies of Wing-Body Interference at High Angles of Attack and Supersonic Speeds.
Final rept. 1 Jun 78-31 May 79,
Goetz H. Klopfer, and Jack N. Nielsen. Oct 79, 87p NEAR-TR-206, ONR-CR-215-263-1
Contract N00014-78-C-0490

The problem of computing the steady inviscid supersonic flows about thin wings having sharp subsonic leading edges and leading-edge separation is solved in this paper. Both wings alone or wings in the presence of the body are considered. To obtain an efficient procedure the steady Euler equations are used as the basic governing equa-

tions as opposed to the more complicated Navier-Stokes equation. The viscous effects, important near the sharp leading edges, are simulated by a Kutta condition applied at the leading edges of the wings. The rest of the flow field is essentially controlled by the inviscid equations. The equations, written in conservation form in generalized curvilinear coordinates, are approximated by MacCormack's second-order accurate predictor-corrector algorithm. The flow tangency conditions at the body surface are satisfied by Abbett's scheme and the outer bow-shock position by the Rankine-Hugoniot jump relations. Internal shock waves or tangentially discontinuities are captured. The slip surface emanating from the leading edge of the sharp wing excited nonlinear instabilities in the MacCormack's scheme, which were stabilized by special flow dependent fourth-order damping terms.

AD-A087 237/4 PC **A06**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Comparison of Wind Tunnel and Flight Test Measurements of Static Aerodynamic Loading of a Captive Store.
Final rept. 18 Jun 76-31 Aug 78,
R. E. Dix, and G. R. Mattasits. Jul 80, 117p Rept no. AEDC-TR-79-9
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A coordinated series of experiments was conducted in three wind tunnels and in flight to measure the static aerodynamic loading of a MK 83 store attached to the bottom center station of a triple ejector rack mounted on the left inboard pylon of an F-4 aircraft. Fundamental agreement between wind tunnel and inflight loads data was demonstrated over a range of angle of attack from -2 to 6 deg and a Mach number range from 0.6 to 0.9. Differences that were noted were thought to be attributable either to improper store-to-aircraft alignment or to poor definition of inertial loads during maneuvering flight. (Author)

AD-A087 445/3 PC **A03**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Determination of the Character of the Lateral-Directional Motion of an Airborne Towed Vehicle.
Phase rept.,
H. George Baroff. 30 Apr 80, 29p Rept no. NADC-80037-60

This report presents the derivation of the lateral-directional equations of motion of an airborne towed vehicle. Herein it is assumed that the tow cable is stable and is attached to the vehicle at other than its center-of-gravity. In addition to customary airborne vehicle equations of motion, the lateral rotation rate of the cable attachment point on the vehicle is described as a function of cable length. Components of cable tension are included in the equations. Determinations of the character of the lateral-directional motion of a HTM-11 and a modified HTM-11 towed vehicles employing the developed equations of motion are discussed. (Author)

PB80-813595 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Boundary Layer Control. 1979-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1979-Jul 80,
Samuel C. Mauk. Aug 80, 58p
Supersedes NTIS/PS-79/0812. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns aspects of boundary layer control. Articles covering suction, blowing, shock wave interaction, magnetohydrodynamic flow, laminar boundary layer cooling, gas and fluid injection, and circulation control as methods of boundary layer control are included. (This updated bibliography contains 234 citations, 100 of which are new entries to the previous edition.)

PB80-813603 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Boundary Layer Separation. 1976-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Jul 80,
Samuel C. Mauk. Aug 80, 108p
Supersedes NTIS/PS-79/0813. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns aspects of boundary layer separation in both laminar and turbulent boundary layers. Articles covering incompressible, transonic and supersonic flown conditions are included. Also included are articles concerning separated flow, shock wave interaction, boundary layer equations, pressure gradients, and three dimensional boundary layers. (This updated bibliography contains 446 citations, 229 of which are new entries to the previous edition.)

1B. Aeronautics

AD-A086 977/6 PC **A06**/MF **A01**
Lockheed-California Co Burbank
Evaluation of the Impact of Towing the L-1011 Airplane at Boston-Logan Airport.
Final rept. Oct 78-Aug 79,
Max A. Gamon. May 80, 114p LR-29190, FAA-NA-80-24
Contract DOT-FA78WA-4199

Results of a research program to determine the impact of towing transport airplanes at Boston-Logan Airport are presented. This study includes the measurement of actual towing loads during airline operations with the L-1011 at Los Angeles International Airport and Dorval, Quebec. The measured towing loads were obtained with an instrumented towbar and portable data recording package. Towing loads were also measured during controlled test conditions at Palmdale using the flight-test L-1011 airplane. A fatigue load spectrum representing ground maneuvering including the effects of extended towing was developed. Stress analysis of the nose landing gear and back-up structure was performed using the load spectrum representing extended towing at Boston-Logan. The results indicate that the proposed extended towing operations do not cause a reduction of fatigue life of the nose gear to below the design life for the L-1011. A discussion of alternate towing concepts is presented, and limiting conditions are defined to ensure acceptable operational safety during extended towing. (Author)

AD-A087 426/3 PC **A07**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
In-Flight Evaluation of a Severe Weather Avoidance System for Aircraft.
Final rept.,
Robert K. Baum, and Timothy J. Seymour. May 80, 128p Rept no. AFWAL-TR-80-3022
Contract FAA/ARD-740

Since there is increased interest in severe weather avoidance systems to augment conventional radar, a joint flight program was undertaken to evaluate the Ryan Stormscope as a thunderstorm avoidance tool. Comparisons were made between Stormscope electrical activity areas and precipitation contours from both on-board and ground weather radar displays. Strongest correlation between radar and Stormscope was found in regions of high precipitation gradients. Comparisons were also made between Stormscope and a ground-based Lightning Detection and Ranging System (LDAR) to determine range and azimuth accuracy of the electrical activity displayed on Stormscope. Because of inherent differences among these systems (i.e., type and rate of data acquisition), corresponding groups of electrical activity areas were compared. Items compared were group area ratios, group overlap areas and group centroid locations. In general, Stormscope groups were larger than corresponding LDAR groups (150% on the average). Additionally, Stormscope group centroid locations differed an average of 15 NM in range and 11 deg in azimuth from those on the LDAR system. This margin of error is acceptable for in-flight thunderstorm avoidance.

AD-A087 435/4 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Annual FAA Forecast Conference Proceedings (4th).
Oct 78, 46p
See also report dated Oct 79, AD-A085 210.

Contents: FAA Initiatives: Forecasting for Decisionmaking; FAA Aviation Forecasts; State System Forecasting; Airport Management; State Aviation Commissions; Regional Transportation Authorities; Federal Government; National Economic Forecasts and Their Impact on the Outlook for Aviation; Counting Activity at Nontowered Airports; Aviation Master Plans and Forecasting; State Transportation Department; and Environmental Impact Statements.

1C. Aircraft

AD-A086 903/2 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Fuel Fire Hazard Penetration into a Model Fuselage as a Function of Circumferential Door Location and Fuel Bed Height.
Rept. for Jun-Sep 79,
Thor I. Eklund, and Joseph A. Wright. May 80, 40p Rept no. FAA-NA-80-9

The purpose of this test program is to devise and evaluate techniques for modeling aircraft cabin fires. A rotatable model fuselage section, 3 feet in diameter and 10 feet long, was placed adjacent to a height-adjustable 4-foot-square pan of JP-4 for fire tests in a quiescent indoor environment. One door on the fuselage side was opened and exposed to the pool fire, while another door in the end of the fuselage remained either opened or closed during the fire test to create natural ventilation effects in the interior. Rotation of the fuselage and raising or lowering the fuel pan provided variations in the resultant interior hazard and led to the following four conclusions: (1) the opening of an additional door always decreases the measured hazard from an external pool fire covering an open doorway in a windless environment; (2) for the specific rotational positions tested on the model, the hazard to the interior from the external fire is increased as the fire base is lowered on the side of the fuselage; (3) when the fuel fire base is maintained at a fixed height with respect to the fuselage, the hazard peaks at the position where actual doorways are installed; and (4) noted discrepancies among past tests with a variety of fuselages can be explained by accounting for differences in door location on the fuselage perimeter and height of the fuel bed. (Author)

AD-A086 932/1 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Remotely Piloted Seaplane for Antisubmarine Warfare.
Final rept.,
C. Joseph Martin, and Basil Papadales, Jr. Jul 80, 28p Rept nos. DTNSRDC-80/078, DTNSRDC-AERO-1267
Presented at the Advanced Concepts Workshop in ASW Weapon Systems, 7-9 Aug 79, Naval Ocean Systems Center.

The remotely piloted seaplane (RPS) for antisubmarine warfare (ASW) is a small, relatively inexpensive, unmanned water-based aircraft that provides excellent time-on-station performance, tactical flexibility, and energy efficiency. In the 1980's, command, control, and communications (C3) technology will be available which will permit a seaplane to be designed with no crew on board. Such a vehicle would be capable of performing military ASW operations in open ocean areas while taking full advantage of its waterborne capability. The removal of a crew from the seaplane has a substantial impact on the aircraft design. A RPS having a 1200 n mi radius of action and 72 hr time-on-station would weigh only 34,800 lb (15,764 kgm) and would incorporate a 5300 lb (2400 kg) ASW payload. (Author)

AD-A086 965/1 PC **A04**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Calibration of a Strain-Gauged CT4-A Undercarriage.
Technical memo.,
V. Romes. Jan 80, 63p Rept no. ARL/STRUC-TM-308

This memo presents the basic equations required to relate strains to components of flight and landing loads acting on CT4-A undercarriage legs. Details of strain gauge locations are contained in ARL Drawing No. 53432 and photographs and details of the test rig are included. The results of the calibration in February 1977 are recorded with details of the subsequent analysis. The application to flight test data is also described. (Author)

AD-A086 970/1 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Analysis of Ground Calibration Data from Strain Gauges Attached to the Airframe of CT4A Airtrainer A19-031.
Technical Memo.,
M. G. J. Higgs. Aug 79, 38p Rept no. ARL/STRUC-296

A CT4A Airtrainer airframe was subjected to wing bending, wing torque, fin loading and tailplane loading. The resulting strains are analysed.

AD-A087 048/5 PC **A08**/MF **A01**
Hughes Aircraft Co Culver City CA
Nonoperating Failure Rates for Avionics Study.
Final technical rept. Sep 77-1 Mar 79,
George A. Kern, Steve S. Tung, Irving Quart, and Kam L. Wong. Apr 80, 154p HAC-FR-79-70-1190R, RADC-TR-80-136
Contract F30602-77-C-0187

This report presents the results of a study of the nonoperating failure rates of USAF avionic equipments. Quantitative assessment data on 26 different equipment/aircraft applications are included. The nonoperating failure rates as determined by three different methods utilizing Air Force maintenance data were measurably significant. On average, MTBF assessment results are improved by 22% when nonoperating failures are excluded from operational MTBF assessments. Average operating to nonoperating failure rate ratios for the equipments investigated ranged from 41 to 188. Comparisons between several reliability prediction methods and operational reliability levels achieved are included. Based on the six equipment types analyzed, it is concluded that field nonoperating failure rates cannot be predicted to a reasonable degree of accuracy by using any of the established prediction methods. (Author)

AD-A087 095/6 PC **A09**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Production Oriented Maintenance Organization: A Critical Analysis of Sortie-Generation Capability and Maintenance Quality.
Master's thesis,
David A. Diener, and Barry L. Hood. Jun 80, 179p Rept no. AFIT-LSSR-52-80

The Production Oriented Maintenance Organization (POMO) represents an Air Force initiative directed at improving sortie-generation capability. Although POMO is currently in use within TAC, PACAF, USAFE, and AAC, its impact has not been fully evaluated. This research was directed at determining what effect, if any, POMO has had on sortie-generation capability and aircraft quality. Six research hypothesis variables relating to sortie-generation capability and three relating to aircraft quality were evaluated to make this determination. Data were obtained from HQ ADCOM and six active duty ADCOM FISs. Performance data covered each FIS before and after POMO implementation. Research findings reflected both positive and negative results. Improvement was found in four sortie-generation variables of which three were strongly related to POMO. Degradation occurred in all three of the aircraft quality variables in the post-POMO period. Within the scope of this research, the authors conclude that, within ADCOM, POMO has had some positive effects on sortie-generation capability and some negative effects on aircraft quality. (Author)

AD-A087 270/5 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Man-Rating of the Navy/Air Force Oxygen Generating System (NAOGS).
Interim rept. 1 Jan 78-30 Sep 79,
Ronald D. Holden, Arnott A. Moore, Kenneth G. Ikels, and Richard L. Miller. May 80, 14p Rept no. SAM-TR-80-12

The Navy/Air Force Oxygen Generating System (NAOGS) program is a joint effort between the Air Force and the Naval Air Development Center to develop a 2-man onboard oxygen generator for tactical aircraft. One of the proposed systems is based upon reversible sorption of oxygen from aircraft engine bleed air using fluomine, a cobalt chelate. The NAOGS fluomine system was manufactured by Garrett/AiResearch Division, Torrance, California. The USAF School of Aerospace Medicine performed man-rating of the NAOGS-fluomine unit prior to flight test by the U.S. Navy. The experimental protocol at USAFSAM consisted of both unmanned and manned testing, during which the product oxygen was monitored for quantity, purity, and trace contaminant content. Man-rating consisted of actual flight simulations with 2 test subjects at four different altitudes for periods up to 2 hours while breathing the product oxygen. The NAOGS, for the most part, performed adequately during both manned and unmanned testing. The exceptions were a lower than specification oxygen production rate and a short-term drop in oxygen purity during each bed switching cycle. These shortcomings are discussed in the context of the forthcoming flight test program. (Author)

AD-A087 273/9 PC **A04**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Thermal Conditions in the Cockpit of USAF Aircraft: Inflight Measurements from the A-7, A-10, F-4, F-15, and YC-14.
Interim rept. Jun 77-Dec 78,
Richard F. Stribley. Apr 80, 69p Rept no. SAM-TR-80-6

Cockpit environmental data are presented for A-7, A-10, F-4, F-15, and YC-14 aircraft. Representative values for dry-bulb, dew-point, and black-globe temperatures; air velocity; and four additional air temperatures are presented for each flight. The data are summarized and the physiological implications of the recorded temperatures are discussed. A detailed description of the USAF School of Aerospace Medicine Miniature Environmental Monitor II (MEM II) is provided. (Author)

AD-A087 275/4 PC **A05**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH
Computer Simulation of Ejection Seat Performance and Preliminary Correlation with Empirical Data.
Final technical rept. 1 Oct 77-1 Feb 79,
Lanny A. Jines. Apr 80, 78p Rept no. AFFDL-TR-79-3150

The comparison of six-degree-of-freedom computer program modeling ejection seat performance to empirical data from ejection seat track tests is discussed. The computer subroutines model the ejection seat components which generate forces on the seat and crewperson combination during ejection. The resulting motion described in terms of trajectory parameters, as well as acceleration time histories on the ejectee is correlated with measured data from recent Air Force track test programs in which ejection seat performance was determined. (Author)

AD-A087 283/8 PC **A10**/MF **A01**
McDonnell Aircraft Co St Louis MO
V/STOL Equivalent Systems Analysis.
Final rept. 27 Aug 79-27 May 80,
Carl G. Carpenter, and John Hodgkinson. Mar 80, 224p NADC-79141-60
Contract N62269-79-C-0700

A fixed base manned V/STOL handling qualities simulation was performed to answer questions concerning: (a) the pilot's frequency range of interest, (b) the maximum allowable mismatch between high order systems and their low order equivalents, (c) acceptability of high order appearing responses and (d) the piloting effects of phase lag at the natural frequency versus time delay. Various high or low frequency terms were added to low order attitude systems. Pilot ratings and comments showed that the pilot's frequency range of interest was .5-4.0 rad/sec; the amount of mismatch allowed was dependent on the type of high order dynamics added on the match frequency range; pilots did not accept high order appearing dynamics and; time delay is a better correlating parameter than phase lag at the configuration natural frequency. Equivalent systems analysis established criteria for the different flying qualities levels in terms of equivalent parameters.

AD-A087 366/1 PC **A05**/MF **A01**
McDonnell Aircraft Co St Louis MO
Aircraft Hydraulic Systems Dynamic Analysis Component Data Handbook.
Final technical rept. 1 Jun 78-Nov 79,
Roy Deshazer, Ray Levek, Mike Stevens, and Bob Young. Apr 80, 100p AFWAL-TR-80-2040
Contract F33615-78-C-2026

The component data handbook has been developed to aid users of the aircraft hydraulic system dynamic analysis computer programs HSFR, SSFAN, and HYTRAN in selecting input data. The handbook provides brief descriptions of the general usage components modeled by these computer programs, tabulates the necessary input data for each program and catalogs typical data trends or actual input data of components that have been simulated. (Author)

PATENT-4 204 659 Not available NTIS
Department of the Navy Washington DC
Energy Absorber.
Patent,
Norman S. Phillips, and William B. Walcott. Filed 25 Apr 78, patented 27 May 80, 7p AD-D007 399/9, PAT-APPL-899 956
Supersedes PAT-APPL-899 956-78, AD-D005 226.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A notched-energy absorber for attenuating high level accelerations such as would occur during aircraft crashes, thereby avoiding injury to a user. The energy absorber force-displacement curve has a large initial spike, followed by a valley or 'notch' and then by a constant force level intermediate the spike and valley levels. In one embodiment, a conventional square-response type shock absorber is connected between a vehicle seat and the vehicle body by a shearable diaphragm fixed to vehicle structure. The diaphragm shears at a notch when it experiences an initial high force, after which the conventional absorber moves freely without deforming until it encounters a stop. The conventional absorber then elongates or compresses in a conventional manner. In an alternative embodiment, a spring is connected between the seat and the vehicle body. Initially, the spring is compressed by experienced forces until at a predetermined force level it forces out a retaining clip or ring. The spring thereupon crushes a honeycomb, forming the valley or 'notch'. After the honeycomb is crushed, a conventional shock absorber attached thereto is compressed in a conventional manner. (Author)

1D. Aircraft Flight Control and Instrumentation

AD-A086 966/9 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Sea King Mk. 50 Helicopter Sonar Dynamics Study. A Simplified Control Systems Mathematical Model.
Aerodynamics rept.,
Christopher R. Guy. Feb 79, 43p Rept no. ARL/AERO-152

A mathematical model, formulating a simplified version of the control systems used in the Sea King Mk. 50 helicopter, is described. The model represents the overall control laws and systems used in the aircraft, although it does not represent

each individual element of the control systems. The control systems model, together with models of the aerodynamics/kinematics and sonar cable/transducer, form the complete model for the Sea King Mk. 50 helicopter/sonar dynamics study. Sample results showing the flight behaviour of the complete model are included. (Author)

AD-A086 969/3 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Sea King Mk. 50 Helicopter Flight Control System. A Mathematical Model of the AFCS (ASW Mode).
Aerodynamics Note,
Christopher R. Guy. Jun 79, 44p Rept no. ARL/AERO NOTE-393

A mathematical model for the anti-submarine warfare (ASW) mode of the automatic flight control system (AFCS) for the Sea King Mk. 50 helicopter is presented. An outline of the ASW mode facilities is given first, followed by a description of the mathematical model, which includes a representation of each major element of the aircraft system. (Author)

AD-A087 126/9 PC **A07**/MF **A01**
National Telecommunications and Information Administration Boulder CO Inst for Telecommunication Sciences
Power Line Carrier Radiation and the Low-Frequency Aeronautical Radio Compass.
Final rept.,
William A. Kissick. May 80, 136p FAA-RD-80-31
Contract DOT-FA79WAI-023

The power line carrier is a telecommunication technique widely used by the power utilities for communication and telemetry. This system uses the power lines as a propagation medium and operates largely in the LF band. Potential for interference to an aeronautical radio compass operating in the 190-535 kHz aeronautical radio-navigation band exists. The purpose of this work was to examine that potential for interference. Laboratory measurements of radio compass receivers were made. These results indicate that 44 to 54 dBu of undesired signal or an undesired-to-desired signal ratio of 4 to 10 dB was required to cause measurable radio compass bearing errors, depending on the type of receiver. An airplane equipped with a spectrum analyzer/data recording system was used to make power line carrier radiation measurements over two selected power lines in Tennessee. The results indicate that, for the limited measurements taken, radio compass bearing errors could be caused by power line carrier radiation for an injected carrier power of 4 W. The distance and height dependence of the power line carrier radiation is discussed. (Author)

AD-A087 201/0 PC **A06**/MF **A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
A Simulator Study of Control and Display Augmentations for Helicopters.
Final rept.,
James C. Adamson, Gerardus J. Born, and Theodor A. Dukes. Jan 80, 105p Rept no. MAE-1428
Contract NAS2-9437

A fixed-based simulator study of a decelerating approach to hover on instruments was performed with five different control augmentation systems ranging from damping feedbacks to attitude command with heading-hold. On a CRT display the environment was simulated by the view of landing pad and the horizon. Superimposed on this image was all flight information needed, together with special symbology for self-contained landing aid based on airborne measurements only; there were a total of four display augmentation levels. Among other findings, the statistically significant differences in data obtained with six test pilots suggest that a relatively inexpensive addition to the display (i.e., quickening of an error rate vector with short term attitude information) makes up for the difference between rate command and attitude command control systems. A quantitative objective measure of improvements was found to suggest the major findings of the report. (Author)

1E. Air Facilities

AD-A086 982/6 PC **A06**/MF **A01**
Transportation Systems Center Cambridge MA
Vortex Advisory System. Volume I. Effectiveness for Selected Airports.
Final rept. Sep-Dec 77,
J. N. Hallock. May 80, 122p TSC-FAA-80-11-1, FAA-RD-80-62-1

The Vortex Advisory System (VAS) is based on wind criterion--when the wind near the runway end is outside of the criterion, all interarrival Instrument Flight Rules (IFR) aircraft separations can be set at 3 nautical miles. Five years of wind data have been obtained for 20 airports. By comparing the VAS wind criterion to the 5 years of wind data, the percentages of time that interarrival separations can be reduced at the 20 airports have been found. The percentages are given on an hourly and a monthly basis. Volume II (to be published at a later date) will examine the VAS effectiveness at Chicago O'Hare (ORD) with respect to the length of the intervals during which reduced separations might have been used. (Author)

AD-A087 135/0 PC **A09**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Field Tests of Plastic Pipe for Airport Drainage Systems.
Final rept. Oct 76-Mar 79,
Walter J. Horn. Dec 79, 190p WES/TR/GL-79-24, FAA-RD-79-86
Contract DOT-FA75WAI-536

Airport designers are beginning to select plastic pipe as an alternative in the design of underdrains, storm sewers, culverts, and similar drainage elements at airports because plastic pipe is economical and easy to transport and install. This report provides information concerning the performance of buried plastic pipe under dynamic wheel loadings. Three types of plastic pipe - polyvinyl chloride (PVC), polyethylene (PE), and acrylonitrile-butadiene-styrene (ABS) - of different diameters were buried at different shallow depths at three separate test sites and were subjected to static and dynamic wheel loads. The PVC pipe performed well under a range of loadings simulating highway and light- and medium-load aircraft traffic. Results for PE and ABS pipe followed. The report concludes that good pipe installation practices should be followed and that a compacted coarse-grained material should be used for bedding, haunching, and backfill to at least a depth of one pipe radius above the crown of the pipe. A cover depth of 12 in. is suggested for PVC pipe for highway 18-kip axle loads, 18 in. for heavier highway loadings and light aircraft traffic, and 24 in. of cover for PVC pipe subjected to medium-load aircraft. PE pipe should be protected with 18 in. of cover from 18-kip axle loads and with 24 in. of cover for heavier highway loads and light aircraft traffic. While 24 in. of cover seemed to be adequate cover for pipe subjected to medium-load aircraft, additional repetitive load tests are required in order to finalize a recommended safe cover depth. (Author)

AD-A087 162/4 PC **A07**/MF **A01**
Smith (Wilbur) and Associates Inc New Haven CT
Collection of Calibration and Validation Data for an Airport Landside Dynamic Simulation Model.
Final rept. Oct 77-Jun 79,
P. B. Mandle, F. LaMagna, and E. M. Whitlock. Apr 80, 149p TSC-FAA-80-3, FAA-EM-80-2
Contract DOT-TSC-1446

The report summarizes the airport data collection procedures employed to obtain the necessary calibration and validation information. The preparation for the data collection effort is explained. A description is presented of the initial work tasks, which included a field reconnaissance, preparation of an individual data collection plan for each of the three airports, and pilot studies at each airport, both to test the proposed survey procedures and to determine the necessary sample sizes. The training processes used for the over 400 field staff who were employed is presented. Descriptions are given of the 32 survey forms and of the techniques used to gather information at each of the airport landside sector elements. Terminal area plans illustrate the location of all field observers. A summary of the data reduction procedures, final data presentation formats utilized and the number of samples obtained are included. Selected statistics produced by the surveys are compared including passenger processing times, curbside dwell times, and modal choice patterns. (Author)

AD-A087 186/3 PC **A09**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Pavement Evaluation and Overlay Design Using Vibratory Nondestructive Testing and Layered Elastic Theory. Volume I. Development of Procedure.
Final rept. Oct 77-Dec 78,
Richard A. Weiss. Mar 80, 176p FAA-RD-77-186-VOL-1

A procedure is developed for determining the allowable load-carrying capacities and the required overlay thicknesses of airport pavements. A layered elastic theory approach is used with vibratory nondestructive tests supplying the dynamic responses of pavements. For a given pavement, a computer program SUBE is used to determine the value of the subgrade Young's modulus from the measured dynamic responses, and a computer program PAVEVAL, which is based on the layered elastic theory, is used to calculate the allowable load-carrying capacity and the required overlay thickness. Limiting subgrade strains and horizontal stresses in pavement layers are used as criteria for determining load-carrying capacities and overlay thickness requirements. Single- and multiple-wheel loadings are considered. Volume II of this report presents a validation of these procedures for three airport sites. (Author)

AD-A087 439/6 MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Condition Survey, Dyess Air Force Base, Texas.
Miscellaneous paper,
R. D. Jackson. Jun 73, 35p Rept no. WES-MP-S-73-43
Availability: Microfiche copies only.

The purpose of this report is to present the results of a condition survey performed at Dyess Air Force Base (DAFB), Texas, during 11-14 December 1972. The following two major areas of interest were considered in this condition survey: The structural condition of the primary airfield pavements; and The condition of pavement repairs and the types of maintenance materials that have been used at this airfield. This report is limited to a presentation of visual observations of the pavement conditions, discussion of these observations, and pertinent remarks with regard to the performance of the pavements. No physical tests of the pavements, foundations, or patching materials were performed during this survey.

AD-A087 441/2 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Condition Survey, Grand Forks Air Force Base, North Dakota.
Miscellaneous paper,
P. J. Vedros, and H. T. Thornton, Jr. Jun 73, 42p Rept no. WES-MP-S-73-42

The purpose of this report is to present the results of a condition survey performed at Grand Forks Air Force Base (GFAFB), North Dakota, during 18-22 April 1972. The following three major areas of interest were considered in this condition survey: The structural condition of the primary airfield pavements; The condition of pavement repairs and the types of maintenance materials that have been used at this airfield; and Any detrimental effects of frost action to the pavement facilities. This report is limited to a presentation of visual observations of the pavement conditions, discussion of these observations, and pertinent remarks with regard to the performance of the pavements. No physical tests of the pavements, foundations, or patching materials were performed during this survey.

AD-A950 005/9 PC **A11**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS

Certain Requirements for Flexible Pavement Design for B-29 Planes.
1 Aug 45, 250p

No abstract available.

2. AGRICULTURE

2B. Agricultural Economics

PB80-207590 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC.
Our Land and Water Resources, Current and Prospective Supplies and Uses.
May 74, 65p MPUB-1290

This report was prepared to provide background information for land use policy discussions. It includes a current summary of national rural land and water uses, estimates of future land and water requirements to meet environmental and institutional factors that affect the availability of land for agricultural and other uses. Major land use problems resulting from competing uses and those causing environmental conflicts are examined. Water supplies, trends in water use, and projected water requirements are discussed.

PB80-207699 PC **A03**/MF **A01**
California Univ., Davis. Div. of Agricultural Sciences.
Efficiency and Equity in Management of Agricultural Water Supplies,
Richard E. Howitt, William D. Watson, and Carole Frank Nuckton. Mar 79, 37p BULL-1892, W80-06081, OWRT-B-187-CAL(3)
Also pub. as Giannini Foundation information series no. 79-1. Prepared in cooperation with California Univ., Davis. Water Resources Center.

This quadratic programming model is an irrigation orientated extension of a model developed by Adams, King, and Johnston and considers a possible 370 production activities for nine field crops and 28 seasonal vegetable crops. The state of California is divided into 14 production regions each with two irrigable soil types. The regions are based on homogeneity of climate, soil type, and water costs and availability. Regional production activities are constrained by the physical availability of land, water, and, in a few cases, by processing capacity. Maximum statewide production is also constrained for all commodities. Data on yields and production costs are given. Perennial crops are not included in the model, but the available amounts of ground and surface water in the model were adjusted regionally to allow for perennial requirements. The model's objective function of maximizing consumers' surplus and producers' quasi-rent yields the optimum crop mix subject to constrained amounts of land, energy, and water.

PB80-207913 PC **A05**/MF **A01**
Fe y Alegria, Panama City.
Rural Cooperativas (Rural Cooperatives).
1980, 100p
Text in Spanish.

The report contains six steps in establishing cooperatives in rural areas of developing countries. The areas discussed are: definition of a cooperative; positions in a cooperative; conducting general meetings; principles of a cooperative; cooperative country store; and board of directors.

2C. Agricultural Engineering

PB80-205586 PC **A05**/MF **A01**
California Univ., Davis. Dept. of Land, Air and Water Resources.
Irrigation Return Water Impact on Selected Attached Diatoms in the Sacramento River, California.
Water science and engineering papers,
Stephen A. Ford, Allen W. Knight, and David E. Bayer. Jul 80, 89p WSEP-4511, W80-06080

While a large percentage of applied irrigation water is consumed through evapotranspiration, enough returns to ground and surface waters to make irrigated agriculture the largest contributor of waste water in the state. Unfortunately, little is known of the impact these irrigation drainage waters have on the biological communities receiving waters. The purpose of this study is to determine the effect of a large irrigation drain on the composition and density of the attached diatom community in the Sacramento River, California.

PB80-207400 PC **A03**/MF **A01**
Auburn Univ., AL. Water Resources Research Inst.
Proceedings of Auburn University Irrigation Workshop, Held at Auburn, Alabama on January 26, 1978,
Larry M. Curtis, Eugene W. Rochester, and James C. Warman. 1978, 33p

Partial contents:
Irrigation systems for Alabama producers;
The effects of crop and soil characteristics on irrigation system design;
Ground water for irrigation;
Irrigation pipe, pump and engine selection;
Economic analysis of irrigation systems;
Drip irrigation--Watering a drop at a time.

2D. Agronomy and Horticulture

PB80-205552 PC **A06**/MF **A01**
California Univ., Davis. Div. of Agricultural Sciences.
Crop Production and Water Supply Characteristics of Kern County,
William D. Watson, Carole Frank Nuckton, and Richard E. Howitt. Apr 80, 108p BULL-1895, W80-06082, OWRT-B-187-CAL(4)
Also pub. as Giannini Foundation information series no. 80-1. Prepared in cooperation with California Univ., Davis. Water Resources Center.

An account of agricultural production in Kern County, California, is given in this report, with a particular emphasis on that all-important component--water for irrigation. The authors have brought together in one place an abundance of information. It may also serve a broader purpose, for Kern County water problems and possible solutions. The analysis of the water supply situation and water costs in Kern County, therefore, merits the attention of state-level water strategists.

2F. Forestry

PB80-205032 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Gum Spots Caused by Cambium Miners in Black Cherry in West Virginia.
Forest Service research paper (Final),
Charles O. Rexrode, and John E. Baumgras. 1980, 15p FSPR-NE-463, NEFES/80-96

Six types of gum spots in black cherry, Prunus serotina, were associated with parenchyma flecks caused by the cambium miner Phytobia pruni. The number of parenchyma flecks and associated gum spots increased with the height of the tree. Four percent of the flecks produced gum spots in the first 18 to 20 feet of the trees; 8 percent of the flecks produced gum between 20 and 60 feet. Most parenchyma flecks and associated gum spots occurred during the first 10 to 15 years of cambial growth.

PB80-207012 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Cooperative Forestry Assistance in the Northeast.
Forest Service research paper (Final),
David A. Gansner, and Owen W. Herrick. 1980, 12p FSRP-NE-464, NEFES/80-97

The report summarizes results of a recent inventory of service forester activities in 20 northeastern states. Each year some 500 local state foresters give one-half million hours of technical assistance and advice about the management of forest resources to nearly 50,000 woodland owners. Yearly on-the-ground help with activities ranging from timber sales to shade tree protection involves more than 2 million acres of nonindustrial private forest.

PB80-209315 PC **A19**/MF **A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Impact of Intensive Harvesting on Forest Nutrient Cycling.
Final rept.
1979, 431p NEFES-80-90
Grant DOE-ET-78-G-01-3424
Proceedings of a Symposium held at Syracuse, New York on August 13-16, 1979.

The Symposium, 'Impact of Intensive Harvesting on Forest Nutrient Cycling', held August 13-16, 1979 at Syracuse, New York, is the result of mutual interests. The concern with accelerated nutrient and organic removals is of great practical significance for the continued productivity of forested lands. Soil nutrient losses through intensive harvesting must be balanced by inputs if the soil resource is to remain unchanged, thus inputs from the atmosphere, biological activity, and mineral weathering must balance potential losses by leaching and erosion, as well as intensive harvesting.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

AD-A087 422/2 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Where Are the Asteroids. The Design of ASTPT and ASTID.
Technical note,
Laurence G. Taff. 15 Apr 80, 81p TN-1980-24, ESD-TR-80-25
Contract F19628-80-C-0002

This note discusses the design of software to be used for the planning of minor plant planet observations and the identification of a particular asteroid when it is observed at a given time. In each case the large number of cataloged asteroids (approximately 2200) has required that the software be optimal with respect to execution speed. The is accomplished by using an approximate geocentric ecliptic position to eliminate, as quickly (in terms of CPU time) as possible, the minor planet from further consideration. In particular, using the type of analysis applicable to near-stationary artificial satellites, (and carefully quantifying the nature of the approximations) an approximate geocentric ecliptic latitude and longitude are obtained in such a fashion that the computations needed for these

are not only minimal but, should the actual location of the minor planet be needed, maximally used there too. The accuracy is (for e < or = 0.3, i < or = 30 deg) 3.9 deg + or - 2.1 deg in geocentric ecliptic longitude and 3.5 deg + or - 1.8 in geocentric ecliptic latitude. With these values we can eliminate approximately half of all asteroids because they will be on that half of the celestial sphere which corresponds to daytime.

3B. Astrophysics

AD-A086 935/4 Not available NTIS
Stanford Univ CA Inst for Plasma Research
Further Evidence of Solar Oscillations with a Period of 160 Minutes,
Philip H. Scherrer, John M. Wilcox, A. B. Severny, Valerie A. Kotov, and T. T. Tsap. 21 Dec 79, 3p
Availability: Pub. in The Astrophysical Jnl. v237 n3 pt2 pL97-L98, 1 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 109/5 PC **A04**/MF **A01**
Iowa Univ Iowa City Dept of Physics and Astronomy
Sources and Sinks of Energetic Electrons and Protons in Saturn's Magnetosphere.
Progress rept.,
J. A. Van Allen, B. A. Randall, and M. F. Thomsen. Apr 80, 74p Rept no. U. OF IOWA-80-16
Contract N00014-76-C-0016
Revised version of original manuscript dated 1 May 80.

This paper reports the results of continuing analysis and interpretation of energetic particle observations obtained by the University of Iowa instrument on Pioneer 11 during traversal of Saturn's magnetosphere in August-September 1979. On the basis of the radial dependence of the phase space density of very energetic protons (E(p) > 80 MeV) and estimates of the necessary source strength, it is reasonably certain that cosmic ray neutron albedo from the planet's atmosphere and Rings A and B is the source of such particles. At radial distance r = 2.7 R(s) and for E(p) > 80 MeV, the ratio of source strength s to radial diffusion coefficient D is approx. 2 x 10 to the 24th power cm(exp 5).

AD-A087 118/6 PC **A03**/MF **A01**
Iowa Univ Iowa City Dept of Physics and Astronomy
Corotation of Saturn's Magnetosphere: Evidence from Energetic Proton Anisotropies. Revision.
Progress rept.,
M. F. Thomsen, T. G. Northrop, A. W. Schardt, and J. A. Van Allen. Jun 80, 35p Rept no. U. OF IOWA-80-14
Contracts N00014-76-C-0016, NAS2-6553
Revision of report dated 28 Apr 80.

The theory and technique of Northrop and Thomsen 1980 are applied to observations of energy spectra and directional aniso-tropies of 0.61 - 3.41 MeV protons in Saturn's magnetosphere. The observations were made by the Goddard Space Flight Center/University of New Hampshire and University of Iowa instruments aboard Pioneer 11 during the Pioneer encounter with Saturn in August/September 1979. Fourier fits to 15-minute intervals of data are combined with spectral indices to yield information about the E x B convection velocity and temporal changes in the particle population. There is a fundamental inability to distinguish unambiguously between the two, but if one can be assumed, the other then follows from these calculations. It is found that although these data do not by themselves allow an unambiguous determination of the extent of corotation in Saturn's outer magnetosphere, they are consistent with exact corotation at the nominal rotation period in the presence of significant but not unreasonable temporal variations in the energetic proton population. (Author)

AD-A087 169/9 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Structure of Solar Granulation. I. Observations of the Spatial and Temporal Behavior of Vertical Motions,
Stephen L. Keil. 10 Sep 79, 13p Rept no. AFGL-TR-80-0215
Pub. in The Astrophysical Jnl. v237 p1024-1034, 1 May 80. See also AD-A087 170.

No abstract available.

AD-A087 170/7 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Structure of Solar Granulation. II. Models of Vertical Motion,
Stephen L. Keil. 10 Sep 79, 9p Rept no. AFGL-TR-80-0216
Pub. in The Astrophysical Jnl., v237 p1035-1042, 1 May 80. See also AD-A087 169.

No abstract available.

AD-A087 171/5 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Diameter of chi Cygni by Speckle Interferometry,
Julian Christou, and Simon P. Worden. 1 Oct 79, 4p Rept no. AFGL-TR-80-0214
Pub. in The Astronomical Jnl. v85 n3 p302-304 Mar 80.

No abstract available.

CNRS-CPT-78-P-1000 MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Quasars and Cosmology.
H. -H. Fliche, and J. -M. Souriau. Mar 78, 53p
In French.
U.S. Sales Only. Microfiche copies only.

On the basis of colorimetric data a composite spectrum of quasars is established from the visible to the Lyman's limit. Its agreement with the spectrum of the quasar 3C273, obtained directly, confirms the homogeneity of these objects. The compatibility of the following hypotheses: negligible evolution of quasars, Friedmann type model of the universe with cosmological constant, is studied by means of two tests: a non-correlation test adopted to the observation conditions and the construction of diagrams (absolute magnitude, volume) using the K-correction deduced from the composite spectrum. This procedure happens to give relatively well-defined values of the parameters; the central values of the density parameter, the reduced curvature and the reduced cosmological constant are: omega sub 0 =0.053, k sub 0 =0.245, lambda-zero=1.19, which correspond to a big bang model, eternally expanding, spatially finite, in which Hubble's parameter H is presently increasing. This model responds well to different cosmological tests: density of matter, diameter of radio sources, age of the universe. Its characteristics suggest various cosmogonic mechanisms, espacially mass formation by growth of empty spherical bubbles. (Atomindex citation 11:506828)

KFKI-1979-33 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Some Implications of the Higher Harmonics of Galatic Anisotropy.
J. Kota. Jun 79, 8p CONF-790836-9
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.
U.S. Sales Only.

It is suggested that higher harmonics of the galactic cosmic ray anisotropy detected in the 1-100 TeV range may be attributed to anisotropic pitch angle scattering. The quasi-linear theory of pitch angle diffusion is applied to obtain the ratio of various harmonics as function of the declination of pitch angle axis. It is found that, to match the observations, the axis should point toward moderate declination (20 deg - 40 deg) while the power spectrum of the interstellar magnetic field fluctuations should have a slope steeper than - 1.5. This latter finding is also consistent with the near constant amplitude of anisotropy over two decades of energy. (Atomindex citation 11:506867)

KFKI-1979-36 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Sidereal Anisotropy of 10 exp 11 EV Cosmic Rays and Interplanetary Magnetic Field Directions.
B. Benko, K. Kecskemety, J. Kota, A. J. Somogyi, and A. Varga. Jun 79, 6p
U.S. Sales Only.

The first two harmonics of sidereal wave in the intensity variations of the Budapest underground telescopes are studied on a year-to-year basis. By comparing the sidereal daily vectors obtained in sectors of opposite IMF directions at a pair of similar telescopes located at conjugate latitudes, one is able to disentangle the solar effects from a galactic anisotropy. Applying this procedure for the Budapest and Hobart measurements, the vector ascribable to galactic anisotropy has an amplitude of approximately 0.02% and phase approximately 5 hr. An attempt is made to draw some conclusion on the undistorted galactic anisotropy by taking into account the heliomagnetospheric deflection. (Atomindex citation 11:506785)

KFKI-1979-46 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Drift-the Essential Process in Losing Energy.
J. Kota. Jul 79, 9p CONF-790836-10
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.
U.S. Sales Only.

It is pointed out that a considerable share of energy loss of galactic cosmic rays in the solar system may be attributed to drift motion against the large-scale electric field. The charge asymmetry introduced by drift is discussed in the framework of an idealized interplanetary field model symmetric to the helio-equatorial plane and thus having no sector-structure. The inclusion of the sector-structure adds important contribution: the larger its latitude-extension is the more energy galactic particles lose. This may be the primary source of the 11-year cycle of modulation. Some features of the present and past solar cycles are interpreted in terms of the model proposed. (Atomindex citation 11:506869)

PB80-208242 Not available NTIS
National Bureau of Standards, Washington, DC.
Supernovae in Molecular Clouds.
Final rept.,
J. C. Wheeler, T. J. Mazurek, and A. Sivaramakrishnan. 1 May 80, 12p
Pub. in Astrophysical Jnl, n3 pt1 p781-792, 1 May 80.

The evolution of a supernova buried in a molecular cloud is studied analytically and compared with preliminary numerical dynamical results.

PB80-212699 PC **A08**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 428, May 1980. Part I (Prompt Reports). Data for April 1980, March 1980.
May 80, 164p SGD-429-PT-1, NOAA-80062401
See also Part 2, PB80-212707, and Part 1, PB80-197635.

In addition to an index for 1979-1980, this prompt report provides data for April 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, spacecraft observations, mean solar magnetic field, coronal holes, and Boulder Geomagnetic Substorm Log. It also provides data for March 1980 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio progagation indices. Late data included in this issue presents solar radio emission March 1980, cosmic rays February 1980, geomagnetic indices February 1980 and daily solar activity centers January 1980.

PB80-212707 PC **A03**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 429, May 1980. Part II (Comprehensive Reports). Data for November 1979.
May 80, 44p SGD-429-PT-2, NOAA-80062402

See also Part 1, PB80-212699, and Part 2, PB80-197643.

In addition to an index for 1972-1980, this issue of comprehensive reports provides data for November 1979 on: solar radio emission, energetic solar particles and plasma, and solar x-ray radiation. Solar flare data are now over a year delayed from data of observation, rather than the usual six months. A delay in the final listing of solar flare data also delays the Daily Flare Index, the Regional Flare Index and the Abbreviated Calendar Record. Miscellaneous data consists of energetic solar particles October 1979, active regions August 13 - September 9, 1979, and synoptic solar maps August 13 - September 9, 1979.

RRK-78-21 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Creation of Particles in Some Expanding Closed Universe.
Hidekazu Nariai. Nov 78, 5p
U.S. Sales Only.

The purpose of this letter is to study the pair creation of particles in an expanding universe by analyzing the dynamical behavior of the Feynman propagator. To deal with the pair creation of particles in the universe under consideration, concrete information about the Feynman propagator in the asymptotic region must be obtained. The Feynman propagator is compared with the corresponding one in case of Chitre-Hartle's model-universe. (Atomindex citation 11:506909)

RRK-78-23 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Creation of Particles in a Robertson-Walker Universe.
Hidekazu Nariai. Dec 78, 5p
U.S. Sales Only.

The purpose of this paper is to study the pair-creation of particles in any Robertson-Walker universe specified by some metric. A massive scaler field and its conjugate momentum can be quantized. Then the commutation relation is imposed on them. The topological condition was ignored when the universe is closed. By making use of the four-dimensional commutation function and the elementary solution, the Feynman propagator is represented. The WKB approximation is adopted to solve the equation of the Feynman propagator. Two special cases of no pair creation (case A) and with pair creation (case B) were considered. It is shown that the pair creation of particles in the case B obey a black body law. (Atomindex citation 11:506910)

UCRL-52946 PC **A11**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Numerical Study of Rotating Interstellar Clouds: Equilibrium and Collapse.
M. L. Norman. Jun 80, 231p
Contract W-7405-ENG-48
Thesis.

Equilibrium and collapse of rotating, axisymmetric, idealized interstellar gas clouds is calculated with a 2D hydrodynamics code. The hydrodynamics features an improved angular momentum advection algorithm. Angular momentum is advected consistently with mass by deriving angular momentum fluxes from mass fluxes and the local distribution of specific angular momentum. Local conservation is checked by a graph of mass versus specific angular momentum for the cloud as a whole. (ERA citation 05:026472)

4.
ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A086 998/2 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Nonlinear Evolution of Diffuse Auroral F Region Ionospheric Irregularities.
Memorandum rept.,
M. J. Keskinen, S. L. Ossakow, and B. E. McDonald. 2 Jul 80, 29p NRL-MR-4246, AD-E000 491

Numerical simulations of the nonlinear evolution of the current convective instability in the diffuse aurora have been performed for conditions typical of the nighttime high latitude F region. Our results show nearly field aligned plasma irregularities developing in regions of well-defined northward gradients of total electron content (TEC) and field-aligned diffuse auroral particle precipitation. In addition, we find equatorward movement of plasma enhancements and northward (poleward) movement of plasma depletions (holes). Furthermore, one-dimensional spatial power spectra of the irregularities in both the north-south and east-west directions are well described by inverse laws. (Author)

AD-A087 011/3 PC **A03**/MF **A01**
Emmanuel Coll Boston MA
Modelling of Equatorial Phase and Amplitude Scintillations from OGO-6 and AE Irregularity Data.
Scientific rept. no. 1, 1 Mar 78-28 Feb 79,
Sunanda Basu, and Santimay Basu. Nov 79, 29p AFGL-TR-80-0141
Contract F19628-78-C-0005

The technique of modelling equatorial phase and amplitude scintillations from in-situ measurements of irregularity amplitude, ambient ionization density and irregularity power spectrum is outlined. The in-situ measurements do not directly provide information on irregularity layer thickness for which radar backscatter observations are utilized. The equatorial scintillation models developed from OGO-6 and AE-C in-situ measurements during the two solstices are presented. Considerable differences in the longitude variation of scintillations are predicted during the two solstices. The model estimates are in good agreement with the available ground based phase and amplitude measurements. Problems associated with the use of bottomside spread-F data for transionospheric propagation modelling at VHF/UHF are also discussed. (Author)

AD-A087 097/2 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Verification of the Bulk Model for Calculations of the Overwater Index of Refraction Structure Function, (C sub N)squared.
Technical rept.,
K. L. Davidson, G. E. Schacher, C. W. Fairall, D. E. Spiel, and E. C. Crittenden. Jul 80, 45p Rept no. NPS61-80-016

Overwater measurements of mean and fluctuating meteorological parameters have been made coincident with optical scintillation measurements. These data have been used to verify the NPS bulk aerodynamics model for calculating the index of retraction structure function, (C sub N)-squared. The average disagreement between calculated and measured values was 33% verifying the validity of the model. IR measured sea surface temperatures cannot be used in the model and this is discussed. (Author)

AD-A087 110/3 PC **A02**/MF **A01**
Aerospace Corp El Segundo CA Space Sciences Lab
Magnetospheric and Interplanetary Electrostatics: A Simple but Explicit Model.
Interim rept.,
Michael Schulz. 1 Jul 80, 10p TR-0080(5505-02)-1, SD-TR-80-44
Contract F04701-79-C-0080

This is a generalization of Dungey's 1961 model for the prototype of an 'open' magnetosphere. The magnetic-field lines are traced by superimposing a uniform B field parallel to the geomagnetic dipole axis. There results a quasi-cylindrical separatrix (the 'magnetopause') between field lines that intersect the earth and those that do not. However, the magnetic field outside the magnetosphere can be multiplied by an arbitrary factor (positive or negative) without altering the field-line geometry. Any discontinuity in B at the 'magnetopause' is supported by azimuthal currents there. The electrostatic problem is asymptotically analogous to that of a dielectric cylinder in an asymptotically uniform electric field (which owes its origin to the solar wind in this case). It is easy to map from the asymptotic solution inward and equatorward, since the magnetic field lines are treated as electric equipotentials. The tangential component of the electric field is continuous at the magnetopause but varies between limits that correspond to the 'open' and 'closed' models of the magnetosphere, as defined by the access of interplanetary plasma. (Author)

AD-A087 164/0 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Sun, Weather and Climate,
J. R. Herman, and R. A. Goldberg. 1980, 4p Rept no. AFGL-TR-80-0213
Pub. in EOS, v61 p6 1980.

No abstract available.

AD-A087 165/7 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Van der Waals Molecules - Possible Roles in the Atmosphere,
Joseph M. Calo, and Rocco S. Narcisi. 15 Oct 79, 6p Rept no. AFGL-TR-80-0212
Pub. in Geophysical Research Letters, v7 n5 p289-292 May 80.

No abstract available.

AD-A087 175/6 PC **A02**/MF **A01**
Utah State Univ Logan Center for Atmospheric and Space Sciences
High-Latitude Convection: Comparison of a Simple Model with Incoherent Scatter Observations,
J. J. Sojka, J. C. Foster, W. J. Raitt, R. W. Schunk, and J. R. Doupnik. 5 Jul 79, 9p AFGL-TR-80-0196
Contract F19628-79-C-0025
Pub. in Jnl. of Geophysical Research, v85 nA2 p703-709, 1 Feb 80.

No abstract available.

AD-A087 176/4 PC **A02**/MF **A01**
Utah State Univ Logan Center for Atmospheric and Space Sciences
A Comparison of Model Predictions for Plasma Convection in the Northern and Southern Polar Regions,
J. J. Sojka, W. J. Raitt, and R. W. Schunk. 18 Sep 79, 9p AFGL-TR-80-0197
Contract F19628-79-C-0025
Pub. in Jnl. of Geophysical Research, v85 nA4 p1762-1768, 1 Apr 80.

No abstract available.

AD-A087 208/5 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Quasilinear Scattering from Waves Driven by Beam-Plasma Instabilities.
Memorandum rept.,
S. H. Brecht, and P. J. Palmadesso. 21 Apr 80, 36p NRL-MR-4203, AD-E000 474

The Starfish southern conjugate rebrightening is explained by velocity diffusion perpendicular to the earth's magnetic field line. The diffusion is caused

by particle scattering off of the harmonics of ion cyclotron waves commonly called Bernstein modes. Quasilinear estimates of the wave fluctuation levels indicate that the debris streaming down the field lines will excite these waves and then be scattered by them.

AD-A087 242/4 PC **A10**/MF **A01**
H S S Inc Bedford MA
Time Delay of Terrestial Light Pulses Propagating through Clouds to Satellite Systems.
Final rept. 1 Apr 77-30 Sep 79 on Task 4.1 - 4.7,
H. S. Stewart, and L. B. Woolaver. 7 Jul 80, 203p HSS-B-058, AFTAC-TR-80-23
Contract F08606-77-C-0024

A method is described and applied for interpreting optically filtered all sky photographs so as to generate curves of the time dependent probability that a photon emitted by an isotropic source near the earth's surface will reach a satellite at any elevation and azimuth in the sky. Two basic concepts are involved: first, that the probability at lambda = 0.76 micron for absorption of light by atmospheric oxygen is proportional to the square root of the dwell time of the light in the atmosphere and second, that a time dependent reciprocity theorem exists allowing observations of the skylight incident on a ground based detector to be interpreted in terms of the probability that a photon starting at the detector can reach a satellite in the direction of the sun. Detailed theory and operating equations were developed and appropriate equipment was built and operated. Computerized reduction of microdensitometer scans of the all sky photographs led to values of mean time delay and transmission for 125000 equal elements of solid angle in the sky. These were summed to generate the time dependent probability. Photographs made at Kennedy Space Center were used to generate delay curves for seven satellite directions on nine separate occasions.

AD-A087 303/4 Not available NTIS
Pacific Missile Test Center Point Mugu CA
Some Synoptic Considerations Relative to the Refractive Effects Guidebook (REG),
Jay Rosenthal, and Roger Helvey. 1979, 23p GIDEP-E164-0544
See also rept. no. NOSC-TD-260 dated 15 Jun 79, AD-A071 781.
Availability: Pub. in Proceedings of Conference on Atmospheric Refractive Effects Assessment, p135-155, 23-25 Jan 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 318/2 PC **A03**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
Solar Eclipse (1979) Part I. Atmospheric Sciences Laboratory Field Program Summary.
Research and development technical rept.,
Melvin G. Heaps, Robert O. Olsen, Warren Berning, John Cross, and Arthur Gilcrease. May 80, 43p Rept no. ERADCOM/ASL-TR-0059
See also AD-A068 723.

The 26 February 1979 solar eclipse provided a unique opportunity to investigate the properties of the middle atmosphere, including the lower ionospheric D region, during a succinct day-'night'-day transition. The Atmospheric Sciences Laboratory (ASL) assisted in coordinating a multiagency field experiment program which encompassed a wide range of effort. Experiments carried out during the several-day period centering on the eclipse were characterized by an unusually high degree of success. Nineteen small sounding rockets and 14 large rockets were launched without a major experimental failure. Ground-based measurements provided additional information. Of particular interest to the Army is the investigation of electron attachment/detachment processes in the D region which in turn have a bearing on ELF, VLF, and HF communications, BMD radar systems, and atmospheric deionization in the post-nuclear-burst atmosphere. This report is Part I of a series and is primarily concerned with providing a summary of the 1979 Solar Eclipse Field Program and sponsored experiments. Part II will provide an account of the experimental data acquired by the ASL experiments, and a subsequent Part III will detail the atmospheric modeling efforts using the data from the 1979 solar eclipse. (Author)

AD-A087 361/2 PC **E12**/MF **E12**
Johns Hopkins Univ Laurel MD Chemical Propulsion Information Agency
JANNAF Handbook Rocket Exhaust Plume Technology. Chapter 3. Rocket Exhaust Plume Radiation.
May 80, 454p Rept no. CPIA-PUB-263-CH-3
Contract N00024-78-C-5384
See also Chapter 4, AD-B021 093.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20810 (No copies furnished by DTIC).

this handbook describes the theory and application of quantitative techniques for predicting rocket plume radiation. The work has primarily been in the area of the shortwave infrared (SWIR) because rocket exhaust gases are typically at temperatures on the order of 2000 to 2500 K, for which the Planck blackbody spectral distribution peaks in the SWIR. Another reason for this is that IR sensor technology is highly developed in the SWIR. In addition, the SWIR is dominated by vibration-rotation molecular emission bands of major species in the plumes.

AD-A087 382/8 PC **A02**/MF **A01**
Alaska Univ Fairbanks Geophysical Inst
Prediction of the Occurrence and Intensity of Magnetospheric Substorms,
S. -I. Akasofu, and J. K. Chao. 24 Jul 79, 4p UAG-B-504, AFGL-TR-80-0224
Contract F19628-79-C-0067
Pub. in Geophysical Research Letters, v6 n11 p897-899 Nov 79.

No abstract available.

AD-A087 433/9 MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
The Investigation of the Magnetospheric Dynamics in Conjunction with the SCATHA Satellite Observations.
Final rept. 1 Oct 78-30 Sep 79,
Ching-I. Meng. Dec 79, 138p AFGL-TR-80-0070
Contract N00017-72-C-4401
Availability: Microfiche copies only.

This task consists of two parts. The first part concerns (a) the collection and analysis of ground-based and satellite data for the purpose of monitoring the magnetospheric conditions in support of the SCATHA satellite activity at Air Force Geophysics Laboratory, and (b) the technical support in the study of the particle and field data returned by SCATHA satellite. The second part is to analyze observations of auroral phenomena made by satellites of the USAF Defense Meteorological Satellite Program. The effort at APL/JHU for the first part of this task was majorly in the role of providing supports to the SCATHA activity and for the second part of DMSP observations was in the understanding of polar region auroral phenomena. Therefore, this final report is divided into a summary of efforts supporting SCATHA and scientific results from analyzing DMSP data. The former consists of (1) a short description of why and how the ground-based magnetic data can be used in monitoring the magnetospheric conditions and (2) a list of data collected together with a guide for using these data. The latter contains (1) a list and abstracts of all scientific reports and journal articles published or submitted for publication, during this reporting period, with at least partial sponsorship attributed to AFGL, and (2) an article concerning a possible diurnal variation of the auroral oval size. (Author)

AD-A087 447/9 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
CAD: A Code for the Calculation of Atmospheric Density.
Technical note,
William L. Oliver. 2 Apr 80, 26p TN-1980-20, ESD-TR-80-28
Contract F19628-80-C-0002

An efficient machine implementation of the 1972 COSPAR International Reference Atmosphere (CIRA) is developed for use in evaluating atmospheric-drag effects upon earth-orbiting satellites. Restriction of this procedure to the satellite-orbit region of significant drag and the use of an alternate temperature profile representation have enabled a factor of 30 improvement in machine execution time compared with that required by the code supplied by CIRA publication while incurring only a few percent difference in the density results. (Author)

4B. Meteorology

AD-A086 919/8 PC **A03**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA Engineering Sciences Lab
Analytic Modeling of Severe Vortical Storms.
Final rept. 9 Jul 79-8 Jul 80,
Francis Fendell, Phillip Feldman, and George Carrier. 8 Jul 80, 45p Rept no. TRW-35524-6001-UT-00
Contract N00014-79-C-0508

Analytic modeling of well-organized convective storms was undertaken to elucidate the evolution from a moderately intense one-cell vortex--characterized by low-level pressure deficits on the order of one percent of atmospheric pressure--to a very intense two-cell vortex--characterized by low-level pressure deficits on the order of ten percent of atmospheric pressure. The physical distinction between the two stages is the insertion of a dry, compressionally heated, nonrotating, central downdraft of originally tropopause-level air in the more severe case. The quasisteady mature description of the thermohydrodynamic structure of each vortex is being developed, and then the conditions for transition from the moderately intense to the very intense vortex are to be sought. The practical motivation is to make progress toward the highly desirable, but very formidable, task of being able to anticipate which tropical storms or minimal hurricanes will evolve to supertyphoons. Description of the two-cell vortex is the current challenge. In particular, the properties and location of the eye wall are sought, since the potential-vortex and surface-inflow subdivisions of the structure of a very intense vortex are in hand. The modeling proceeds from basic thermohydrodynamic principles. Nonessential geometric detail, as well as association of conclusions with the details of particular parameterizations, is being avoided as much as possible.

AD-A086 931/3 MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
A Winter Environmental Data Survey of the Drainage Basin of the Upper Susitna River, Alaska.
Special rept.,
Michael A. Bilello. Apr 80, 35p Rept no. CRREL-SR-80-19
Availability: Microfiche copies only.

Basic data on the winter climate and measurements on all available snow and ice cover conditions were compiled for an area in and around the Upper Susitna River Basin of Alaska. The 10 years of tabulated data (from September 1964 to May 1974) for 16 locations include average monthly values of air temperature, precipitation amounts (including total snowfall), and maximum depth of snow on the ground. Ice thickness measurements and other related winter surface conditions on rivers in the basin are included in the report. Detailed observations on physical properties of the snow cover and the rate at which soil thaws in the spring are also provided for selected stations near the area under study. (Author)

AD-A086 945/3 PC **A06**/MF **A01**
Environmental Research Inst of Michigan Ann Arbor
Climatology of Selected Areas of West Germany Affecting Sensor Performance.
Technical rept.,
A. Lawson. Jun 79, 124p Rept no. ERIM-138300-23-T
Contract DAAK70-78-C-0198

This report contains a body of climatological data on several areas in West Germany which are being

used in scenarios for study of the technical and operational effectiveness of methods of detecting remote minefields. The weather to be considered in the technical screening and analysis is that typical of the North German Plain, the Fulda Gap, and the Hof Corridor. Climate affects the ability of the sensor to obtain a useful signal return from the target and affects the signal return from background i.e., the vegetation and terrain surface and subsurface materials. Temperature data given include mean temperatures and diurnal temperature variations. Precipitation data include monthly mean precipitation, precipitation rates, rainfall frequency and duration. Data are given on cloud types, fractional sky cover, and various types of statistics on cloud obscuration. Data on fog frequency and visibility provide further information affecting target obscuration. Representative weather sequences are also tabulated for use in scenarios. (Author)

AD-A086 983/4 PC **A04**/MF **A01**
Washington Univ Seattle Polar Science Center
FRAM I Meteorology Report,
Eric Leavitt, and Roger Andersen. May 80, 61p
Contract N00014-79-C-0032

The Fram experiment was conceived as a series of studies to study the geophysics and oceanographic characteristics of the eastern Arctic. The meteorological experiment was designed to provide basic data on wind velocities for the oceanographic experiments, to measure the drag coefficient of the pack ice in the area of the camp, and to collect standard weather data and transmit it to Thule for inclusion in the synoptic network and for planning flight support operations. This report describes the experiment, the data analysis procedures and the data products which are available. The time series of half hour averages of wind speed, direction, and air temperature plus the air pressure every three hours are included as an appendix. Results of the drag coefficient calculations are also included.

AD-A087 023/8 PC **A02**/MF **A01**
Weather Wing (7th) Scott AFB IL
Satellite Derived Winds.
Technical note,
Brian E. Heckman. 1 Jul 80, 14p Rept no. 7WW/TN-80/002

This report explains how satellite derived winds are produced, discusses reliability and accuracy of satellite winds, possible uses, and provides instructions for decoding TWXX-series bulletins. It identifies differences in decoding procedures for U.S., Japanese, and European GOES wind bulletins, and it also provides example of bulletin and how data may be plotted.

AD-A087 028/7 PC **A05**/MF **A01**
Physical Dynamics Inc La Jolla CA
Stability of Boundary Layer Flow.
Final rept. 11 Sep 79-31 Jan 80,
B. E. Freeman, and L. E. Hauser. Mar 80, 89p
Rept no. PD-LJ-80-220
Contract N00173-79-C-0302

A technique is developed and applied for the evaluation of conditions under which marine boundary layers are unstable, and for computing the rate of growth of unstable motions. Linear perturbation equations are formulated which account for influence of wind shear, static stability, Coriolis force, turbulent diffusion, large-scale convergence, and geostrophic wind on linear stability. The mean quantities can be prescribed by analytic functions or supplied as numerical tables derived either from observed/specified data or a boundary layer model. The linearized model is solved as a generalized eigenvalue problem. Related calculations with the SIGMET code are discussed, including radar properties of the marine boundary layer. (Author)

AD-A087 070/9 PC **A05**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
A Demonstration Test of the Modular Automated Weather System (MAWS).
Final rept. Jan 77-Jan 79,
Donald A. Chisholm, Richard H. Lynch, James C. Weyman, and Edward B. Geisler. 24 Mar 80, 85p
Rept nos. AFGL-TR-80-0087, AFGL-IP-285

A microprocessor-based automated airfield weather observing and forecasting system called MAWS (Modular Automated Weather System) was developed to demonstrate the feasibility of modernizing many of the observing and forecasting functions performed in operational base weather stations. Scott Air Force Base, Illinois, was chosen as the demonstration site and operations were conducted from January 1977 through January 1979. Weather sensors at five observation sites around the airfields were polled several times each minute, the data transmitted over commercial, voice-grade telephone lines to a central supervisory microprocessor where the data were suitably collated, averaged and formatted for display on alpha-numeric display devices at key locations and for magnetic tape archiving for post analysis. The demonstration confirmed that modernized weather support can be largely achieved with state-of-the-art, commercially available hardware/software. Such a system would be compatible with other automation efforts in civilian weather services and other C-cubed efforts in the DOD. The advantage of spatially and temporally detailed weather information in marginal and adverse situations was documented. Sensor siting considerations were addressed in relation to specific weather elements and observational requirements. The contributions of automated met watch procedures and short-range guidance forecasts of RVR landing minima were demonstrated. Feedback on system performance and acceptability was obtained from cognizant AWS offices. (Author)

AD-A087 098/0 PC **A07**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
The Low-Level Wind Shear Alert System (LLWSAS).
Final rept. Jan 77-Mar 79,
R. Craig Goff. May 80, 131p FAA-NA-80-1, FAA-RD-80-45

The results of the Low-Level Wind Shear Alert System (LLWSAS) field test and evaluation are reported. The system is a computer controlled anemometer mesonetwork used to detect near-surface wind discontinuities associated with strong thunderstorms and cold fronts -- those that are potentially hazardous to low-flying aircraft. The test and evaluation was conducted at seven major airports in the United States. This report discusses the principal meteorological events that will trigger alarms, the system hardware and software, and characteristics of the system that are unique to each airport. Heavy emphasis is placed on the proper siting of anemometry which was found to be the most important factor influencing high quality system performance. The siting criteria enumerated should serve as a model for future installations. Deviations from the model will severely impact system performance. The origin and justification for the vector difference threshold is discussed as well as LLWSAS by-products: wind gust determination and special displays for Terminal Radar Approach Control Facility (TRACON) rooms. (Author)

AD-A087 137/6 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Icing Characteristics of Low Altitude, Supercooled Layer Clouds.
Interim rept. Feb-Oct 80,
Richard K. Jeck. May 80, 73p FAA-RD-80-24
Contract DOT-FA79WAI-020

A limited amount of new data has been obtained on the icing environment during initial airborne measurements aimed at developing environmental icing criteria for use in certifying helicopters for flight into icing conditions. Super-cooled cloud characteristics are reported for 12 icing events encountered at temperatures from -10 C to 0 C at altitudes from 3500 to 6500 ft above the surface of Lake Erie and Lake Michigan. Recorded droplet size spectra from a Particle Measuring Systems' Axially Scattering Probe (ASSP) were used to compute droplet mass (volume) median diameter (MMD) and, in addition to a Johnson-Williams LWC Indicator, the liquid water content (LWC). A review of available historical data from 1944-1950, upon which the atmospheric icing standards of Appendix C, FAR 25 were based, reveals that data obtained from measurements of ice accretion on multidiameter cylinders are subject to a number of significant errors of both signs. These probable errors, which will continue to be evaluated, may be responsible for the conclusions that (1) the historical LWC values are generally larger than those observed in the flights described in this report, (2) the historical MMDs appear to be generally too small for all values of LWC and (3) the historical droplet size distributions are unreliable, as is acknowledged in the later historical literature. (Author)

AD-A087 264/8 MF **A01**
Naval Postgraduate School Monterey CA
Atmospheric Marine Boundary Layer Mixing Rates in the California Coastal Region.
Technical rept.,
G. E. Schacher, C. W. Fairall, and K. L. Davidson. May 80, 124p Rept no. NPS61-80-003
Availability: Microfiche copies only.

The Naval Postgraduate School has conducted five research cruises in California coastal waters for which sufficient data was obtained to allow boundary layer mixing rates to be determined. These data have been processed to determine the mixing rates. The rates have been correlated with meterorlogical conditions and geographical location and average values for use in air pollution models have been determined. A simplified method for calculating the mixing rate from mean meteorological parameters is presented. (Author)

AD-A087 299/4 PC **A04**/MF **A01**
Louisiana State Univ Baton Rouge Coastal Studies Inst
A Collection of Reprints,
S. A. Hsu, David B. Prior, James M. Coleman, William J. Wiseman, Jr., and Stephen P. Murray. Jul 80, 60p Rept nos. TR-294, TR-297
Contract N00014-75-C-0192
Includes rept. nos. TR-298, TR-300 and TR-301. Pub. in various jnls.

Contents: Research in Coastal Meteorology; Mesoscale Nocturnal Jetlike Winds within the Planetary Boundary Layer over a Flat, Open Coast; Submarine Landslides- Geometry and Nomenclature; Positioning Accuracy for Estuarine and Inlet Dynamics; and A Coastal Jet in the Chukchi Sea.

AD-A087 451/1 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19704B MLRS, Missile Number 332, Round Number B-75, 25 January 1980.
Meteorological data rept.
Jan 80, 12p Rept no. ERADCOM/ASL-DR-1119
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19704B MLRS, Missile Number 332, Round Number B-75 are presented in tabular form. (Author)

AD-A087 452/9 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19704B MLRS, Missile Number 197, Round Number B-76, 25 January 1980.
Meteorological data rept.
Jan 80, 15p Rept no. ERADCOM/ASL-DR-1120
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19704B MLRS, Missile Number 197, Round Number B-76 are presented in tabular form. (Author)

AD-A087 453/7 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19705B MLRS, Missile Numbers 199, 169, 168, Round Numbers B-77, B-78, B-79, 29 Jan 1980.
Meteorological data rept.
Jan 80, 15p Rept no. ERADCOM/ASL-DR-1121
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19705B MLRS, Missile Numbers 199, 169, 168, Round Numbers B-77, B-78, B-79 are presented in tabular form. (Author)

AD-A087 454/5 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
19306B MLRS, Missile Numbers 1126 and 1128, Round Numbers V-109 and V-110, 4 February 1980.
Meteorological data rept.
Feb 80, 17p Rept no. ERADCOM/ASL-DR-1122
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 19306B MLRS, Missile Numbers 1126 and 1128, Round Numbers V-109 and V-110 are presented in tabular form. (Author)

AD-A087 455/2 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
17901A Honest John, Missile Number 2050, Round Number 666 ASL, 5 February 1980.
Meteorological data rept.
Feb 80, 14p Rept no. ERADCOM/ASL-DR-1124
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 17901A Honest John, Missile Number 2050, Round Number 666 ASL are presented in tabular form. (Author)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A086 911/5 PC **A03**/MF **A01**
Wharton School Philadelphia PA Dept of Decision Sciences
Labor-Management and Codetermination in Regulated Monopolies.
Technical rept.,
Paul R. Kleindorfer, and Murat R. Sertel. Oct 79, 44p Rept no. 79-10-05
Contract N00014-77-C-0171

This paper has two central themes: the comparative analysis of alternative institutional forms of labor influence in monopolies; and the design of regulatory mechanisms for improving the welfare efficiency of such firms. Concerning the comparative analysis of different firm types, labor-managed and codetermined firms have two basic problems: underemployment and perverse short-run adjustment to price changes of output and long-run inputs. In addition, labor-managed firms may undervalue investment projects and retained earnings relative to efficient market levels. On the positive side, being the partial recipient of residual profits in the firm improves labor productivity. The policy implications of this analysis are simply stated. If overemployment or low productivity are central problems, then increasing labor's influence in the firm, with concommitant incentives, is a possible cure. Just how well this cure is likely to work relative to a traditional capitalist-managed firm depends, inter alia, on the income elasticity of workers' effort (how well they will respond to productivity incentives) and the price elasticity of demand (how strongly the market reinforces increases in output resulting from improved productivity). Regarding regulation, lump-sum taxes, and income and price regulation can improve the efficiency of labor-managed and codetermined firms. More direct regulation is specifying acceptable levels of capital input and employment will naturally also improve efficiency, gross of the transaction costs involved.

AD-A086 953/7 PC **A02**/MF **A01**
Young (Arthur) and Co Washington DC
Research on Internal Controls and Auditing. Navy Financial Management Improvement Program. Volume 1. Management Summary.
Interim rept.
Jun 80, 10p
Contract N00014-79-C-0935
See also Volume 2, AD-A086 954.

The purpose of this interim report is to summarize the results of our survey and documentation of present Navy internal control and auditing practices related to distributed systems and present our research findings on the impact of distributed systems on internal control. The overall objective of this engagement is to assist the Navy in developing improved internal controls and EDP audit capability in the area of distributed systems and minicomputers.

AD-A086 954/5 PC **A05**/MF **A01**
Young (Arthur) and Co Washington DC
Research on Internal Controls and Auditing. Navy Financial Management Improvement Program. Volume 2.
Interim rept.
Jun 80, 91p
Contract N00014-79-C-0935
See also Volume 3, AD-A086 955.

The purpose of this volume is to present the results of our research regarding the impact of the distributed system environment on internal controls. The discussion in this volume addresses general EDP procedures (e.g. environmental controls). General EDP procedures are concerned with overall organization, policies, procedures and controls which are common to all EDP applications. Because of the interrelated nature of application controls and the auditor's evaluation of internal controls, application controls will be considered in Task 4 of this project.

AD-A086 955/2 PC **A09**/MF **A01**
Young (Arthur) and Co Washington DC
Research on Internal Controls and Auditing. Navy Financial Management Improvement Program. Volume 3.
Interim rept.
Jun 80, 195p
Contract N00014-79-C-0935
See also Volume 1, AD-A086 953.

The purpose of this volume is to present the results of our efforts related to Task 2, (Part II) of our project task plan. This task was designed to enable our project team to develop an understanding of the Navy's existing and developing ADP internal controls and the current practices of the Naval Audit Service. This knowledge was needed to guide our research efforts and provide a basis from which recommendations to improve the internal control environment in the Navy could be made. The report is divided into the following: Naval Audit Service; NAVDAC and the System Development Process; The NARDAC Operating Environment; System Surveys; System Descriptions (Appendices A & B); Observations and Conclusions; Impact of Task 2 on Future Efforts.

AD-A087 082/4 PC **A09**/MF **A01**
Army Concepts Analysis Agency Bethesda MD
Implementation of Change (IC).
Final rept.,
Leroy A. Babbitt, Samuel M. Burney, Jr., and Jerry W. Mangrum. 30 Jun 80, 199p Rept no. CAA-SR-80-5

The IC Study consists of an analysis of processes for approving, resourcing, and implementing TOE changes. Existing systems for programming resources to accomplish TOE changes and management processes for generating, reviewing and approving associated MTOE changes are also discussed and analyzed. Alternative measures to improve the synchronization of TOE change implementation and the resource allocation process are discussed and evaluated. The report consists of six chapters, supported by technical appendices. Chapter 1 provides introductory material and background. Chapter 2 contains a discussion of how the study was conducted. The current system that is used to generate TOE changes and apply them to the force structure is described in Chapter 3. Chapter 4 discusses alternative systems that have been formulated and analyzed. Prescriptive measures that appear to have the potential of improving certain management procedures are presented in Chapter 5. The final chapter presents the major observations of the study team pertaining to the impiementation of organizational changes into the US Army force structure. (Author)

AD-A087 086/5 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Analysis of Essential Logistics Support Data Items.
Master's thesis,
Carmine J. Forzono, and Robert I. Mitchell. Jun 80, 110p Rept no. AFIT-LSSR-12-80

This thesis involves the analysis of logistically important data that are procured and funded by System Program Offices (SPOs) within Aeronautical Systems Division (ASD). Data which are procured by the SPOs, but which are funded by the Air Logistic Centers (ALCs) are not addressed in this study. The results of this thesis are designed to assist the logistics manager assigned to an aeronautical SPO by providing to him/her a ranking of Data Item Descriptions (DIDs) by their logistics value. This judgment was furnished by logistics data managers and functional users in the ALCs, and by selected SPO logistic managers. It is hoped that the results of this research will help SPO logistic managers in identifying DIDs that have logistic value to the aeronautical system being acquired. The final results include a ranking of 60 DIDs into four categories ranging from high to low logistics value, along with a brief description of the purpose of each DID studied. (Author)

AD-A087 091/5 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Assessment of Current Methodologies Used to Evaluate Foreign Military Sales Payment Schedule Effectiveness.
Master's thesis,
John W. Dutcher, III, and Douglas C. VanWiggeren. Jun 80, 141p Rept no. AFIT-LSSR-24-80

The sale of military hardware, related equipment, and services to other nations has become, in recent times, an important political tool in international relations and an important source of revenue for the United States. This thesis effort is designed to examine the alleged problems associated with a determination of the effectiveness of the USAF FMS payment schedule with respect to its capability to predict FMS billing statements. Three methods are identified and evaluated as indicators of effectiveness. The results did not indicate that the methods were satisfactory but did find problems within the FMS financial management area in the structure of data for comparison. Recommendations for improvements are made. (Author)

AD-A087 224/2 PC **A09**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Analysis of the Planning Variable as it Relates to the Closure of a Small Air Force Unit.
Master's thesis,
Robert J. Harvey, and George C. Kiessling, Jr. Jun 80, 181p Rept no. AFIT-LSSR-14-80

The purpose of this study is to analyze the effect that planning has on the effectiveness of the closure process of small Air Force units. With the long-range radar site closures of Air Defense Command under the Joint Surveillance System as a model, the Study analyzed and developed a complete Program Action Directive which was suggested for use under the closure process. The need for such a documented checklist arises because previous DOD efforts to streamline the small-site closure process have fallen far short of expectations. The research also strives to develop firm objectives for the closure process, measurements for these objectives, and correlations between these measures of an effective closure and the completeness of the closure plan with the suggested PAD as a basis for complete planning. (Author)

PB80-205487 PC **A03**/MF **A01**
Washington State Dept. of Social and Health Services, Olympia. Planning and Research Div.
Productivity and Management in Human Service Programs,
Charles A. Lund, Timothy R. Brown, and John C. W. Cadoo, Jr. Apr 78, 44p
Library of Congress catalog card no. 78-620035. Prepared in cooperation with Washington State Office of the Governor, Olympia.

Productivity as applied to human service programs refers to the efficiency and effectiveness of the programs. The project attempted to develop a model for productivity measurement based on experience in applying the concept of productivity measurement to two very different types of programs - foster care and nursing homes.

PB80-205495 PC **A05**/MF **A01**
Virginia Joint Legislative Audit and Review Commission, Richmond.
The Sunset Phenomenon.
1979, 96p
Papers of a Forum on Legislative Oversight, July 25, 1977.

The report contains papers from a forum held in July 1977 on the topic of Sunset legislation. This type of legislation calls for periodic legislative review and evaluation of all State programs, agencies, or functions. Colorado's Sunset experience is described in detail. A survey of Sunset legislation for all the states is included. Also discussed is the Federal response to these laws.

PB80-206618 PC **A08**/MF **A01**
National Association of Housing and Redevelopment Officials, Washington, DC.
Designing Rehab Programs. A Local Government Guidebook.
Oct 79, 174p HUD/PDR-534, HUD-0001495
Contract HUD-H-2626

The report describes and analyzes the typical ways in which local rehabilitation programs have been designed and operated under the Community Development Block Grant Program (CDBG). This guide, resulting from a study involving field visits to six localities, presents an indepth look at how rehabilitation programs differ in terms of administration, needs addressed, nature of households assisted, techniques for providing financial assistance, and delivering assistance. Concentrating on a small but highly diverse sample of active programs, the report offers useful insights into a broad range of financing techniques. Sites were selected to represent a variety of methods for processing assistance, a variation in city size, and a geographic diversity. The programs were studied in terms of three major issues confronting rehabilitation efforts: (1) meeting rehabilitation needs; (2) providing financial assistance; and (3) administering an assistance program. All information presented represents 1978 findings.

PB80-206964 PC **A04**/MF **A01**
Nevada Legislative Counsel Bureau, Carson City. Legislative Commission.
Effect of Government Regulation of Small Business. (Nevada).
Oct 78, 64p BULL-79-12

The report examines the relations between small businesses in Nevada and the state and local governments which serve and regulate them. Several problem areas are identified and recommendations for improvement are provided.

PB80-207863 PC **A10**/MF **A01**
Texas Energy Advisory Council, Austin.
A Study of the Texas Energy Advisory Council: Its Structure and Functions Relative to State Science, Engineering and Technology Transfer (SSET),
Milton L. Holloway, Robert J. King, and Marla Stevens. Jun 79, 217p NSF/RA-790425
Grant NSF-ISP77-25884

The study examines the organizational structure and functions of the Texas Energy Advisory Council (TEAC). It identifies practical changes which could enhance TEAC's ability to develop, transfer, and integrate science and technology (S & T) information to the energy decisionmaking process. This 'case study' focuses on the historical development of the Council from an S & T perspective. Problems are discussed and solutions offered for improved interactions among TEAC and university-energy research institutes and executive and legislative offices. Philosophical underpinnings of the Council structure and its functions are presented. State Science, Engineering, and Technology (SSET) transfer perspectives and recommendations are reported. The study concludes that the Council is an effective institution for generating a balanced input to the policymaking process from major science and technology centers. Certain weaknesses were identified and a number of alternatives offered to increase effectiveness of the Council's operation. Appendices include copies of official documents, a 1978 update of Texas energy policy, and a TEAC publication list.

PB80-209026 PC **A04**/MF **A01**
Advanced Management Systems, Inc., Washington, DC.
Life-Cycle Cost Procurement Procedures for Advanced-Design Buses (Development and Test Application).
Final rept. May 79-May 80,
H. R. Kain, G. J. Marks, and F. M. Hall. 30 May 80, 70p UMTA-VA-06-0045-80-1

The report reflects UMTS's efforts to assist the grantees to comply with the DOT FY 1980 Appropriations Act requirement that contracts for the acquisition of rolling stock, including urban buses, and that be awarded only after consideration of performance, standardization, life-cycle costs, etc., in addition to initial capital costs. A key to this assistance is presented in this report, namely--a set of acceptable, workable life-cycle costing procedures and guidelines to be used by the bus manufacturers and the grantees in life-cycle procurements. The study develops the life-cycle cost tools, guidelines, and procedures applicable to the bus industry and to apply the principles of life-cycle costing to the real-life environment of Advanced Design Bus (ADB) purchases. Tests were conducted by two transit properties--Phoenix Transit Authority (Phoenix, Arizona), and the Regional Transportation authority (Chicago, Illinois). The parallel, nonbinding life-cycle cost procurements of ADB by the two transit operators demonstrated that life-cycle costing, when used as a procurement tool, is a viable alternative to the current low-bid acquisition of urban buses. The tests further showed that life-cycle cost procurement provides the grantees with the data necessary to make a more cost-effective purchase; it also provides the manufacturers an incentive to modify their bus designs to achieve better quality at a lower total cost of ownership.

PB80-210263 PC **A18**/MF **A01**
Louisiana Governor's Office of Science, Technology and Environmental Planning, Baton Rouge.
State of Louisiana Science, Engineering and Technology Program, Final Grant Report. A Study Conducted by the Governor's Office of Science, Technology and Environmental Policy (SSET).
Final rept.,
Lee W. Jennings. 1979, 424p NSF/RA-790414
Grant NSF-ISP77-25881

The report discusses eight tasks undertaken to identify ways the State of Louisiana could utilize science and technology to improve the overall quality of life. These tasks were to: (1) access the existing mechanism for science and technology (S & T) input into the policy process of Louisiana's state executive and legislative branches, (2) review other states' S & T programs, (3) perform a problem assessment and needs analysis for Louisiana, (4) perform a technical resource assessment, (5) sponsor a seminar and workshop on S & T applications and resources available to state policy formulators and administrators, (6) investigate the potential costs and benefits of modernizing the classification system of S & T related material utilized and available to state lawmakers and executive department officials, (7) investigate the costs and benefits of the role econometric modeling can play in assisting policy formulation within the decisionmaking process, and (8) investigate recommendations concerning advisory structures for policy formulation on matters of science, engineering, and technology.

PB80-210677 PC **A04**/MF **A01**
California Univ., Irvine. Public Policy Research Organization.
Recent Research on Fiscal Limitation Measures: A Selective Survey,
James N. Danziger, and Peter Smith Ring. 1980, 66p WP-80-117, NSF/RA-800131
Grant NSF-DAR78-24567

The causes and consequences of California's passage of Proposition 13 are reviewed through an examination of recent literature. Knowledge from the study is used to form tentative conclusions concerning ways of improving government fiscal policy. The report is divided into five sections: (1) classification of alternate types of policy instruments that attempt to operate as fiscal constraints on governments; (2) examination of recent literature regarding causes of the fiscal limitations movement in general, and Proposition 13 in particular; (3) a study of the effects, focusing on what scholars and researchers have suggested, of the immediate and most likely outcomes of Proposition 13; (4) tentative conclusions about who appear to be the winners and losers from measures aiming to lower taxes, limit government spending, and produce more 'efficient' government; and (5) an outline of an agenda for research on fiscal limitations measures, indicating areas for continued activities. Included is a table showing the rank-ordering of importance of conducting research on selected issues related to fiscal limitations measures.

5B. Documentation and Information Technology

AD-A086 948/7 PC **A08**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Indirectly Funded Research and Exploratory Development at the Applied Physics Laboratory, Fiscal Year 1978.
Annual rept. 1 Jan -31 Dec 78,
R. W. Hart. Dec 79, 169p Rept no. JHU/APL/SR-79-2
Contract N00024-78-C-5384

The report is organized in two parts. The first part summarizes the IR&D work of the Research Center, which is the Division of the Laboratory devoted primary to long-term scientific research. The second part summarizes the IR&D activities carried out in other, generally more applications-oriented, groups of the Laboratory.

AD-A087 000/6 PC **A13**/MF **A01**
Defense Technical Information Center Alexandria VA
Source Header List. Supplement 3.
Report for period ending 9 Jun 80,
James P. Burrell. Jun 80, 300p Rept no. DTIC/TR-80/5
Supplement 3 to Rept. no. DDC/TR-77/2, AD-A041 700. Supersedes Supplement 2, Rept. no. DDC/TR-79/1, AD-A069 900.

Source names used by the Defense Technical Information Center in the Research and Technology Work Unit Information System, and the Technical Report, Program Planning, and Independent Research and Development Data Banks are compiled alphabetically. Each of the source names is assigned a 6-digit numeric code for computer input and retrieval, a 4-digit alphanumeric geopolitical code and a 1-digit alphanumeric type code. This supplement is a companion to the Source Header List, AD-A041 700. (Author)

AD-A087 065/9 PC **A04**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
Annotated Bibliography of the Air Force Human Resources Laboratory Technical Reports - 1978.
Final rept.,
Esther M. Barlow. Jun 80, 66p Rept no. AFHRL-TR-80-1

This annotated bibliography presents a listing of technical reports (1978) dealing with personnel and training research conducted by the Air Force

Human Resources Laboratory (AFHRL). The research has been conducted by professional personnel representing a variety of disciplines, including psychologists, operations research specialists, mathematicians, computer analysts, economists, electronic engineers, aeronautical engineers, and technical support personnel. AFHRL is charged with the planning and execution of Air Force exploratory and advanced development programs for selection, motivation, training, retention, education, assignment, utilization, and career development of military personnel; also the composition of the personnel force and training equipment. In addition, this Laboratory provides technical and management assistance to support studies, analyses, development planning activities, acquisition, text evaluation, modification, and operation of aerospace systems and related equipment. (Author)

AD-A087 357/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Programs for Distributed Computing: The Calendar Application,
Irene Greif. Jul 80, 11p Rept no. MIT/LCS/TM-168
Contract N00014-75-C-0661

The calendar application involves a wide range of issues in distributed computing, from implementation of distributed data bases to design of a user interface that will enable the user to comprehend the complex distributed environment in which he is working. This memo summarizes current status of design and implementation of calendars. Sections 2 and 3 are taken from a progress report of March 1980 and section 4 is an update to that report including current status plans. We began our design of calendar systems with the intention of focussing on implementation issues, particularly those of communication, sharing of data, and the use of forms as the standard interface among modules. To assure variety in our implementation experience, we generated alternative designs of calendars. Implementations of several of them are now underway. During later design phases we became more interested in the functionality of the calendar and its user interface. To some extent the use of forms as the communication medium shapes the human interface as well as the process-to-process interface. Also, some aspects of the functionality, most notably the notion of 'tentative meeting' have arisen from analysis of the distributed implementation. Section two is a report on the functionality of the calendars we are building. Section three is about the distributed implementation. (Author)

AD-A087 420/6 PC **A03**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Database Management in Scientific Computing II. Data Structures and Program Architecture,
Carlos A. Felippa. Feb 79, 40p Rept no. LMSC/D673048
See also report dated 1 Mar 78, AD-a085 554.

This second of a three-part paper on scientific database management prepares the ground for the operational description of a multilevel data management system in Part III. Following a detailed categorization of data and storage structures, principles of program architecture deemed necessary to make most efficient use of centralized data management techniques are discussed. General operational requirements of data management systems are presented, and the notion of activity levels introduced. This part closes with a brief review of the evolution of data management techniques in the context of computerized structural analysis.

ED-176 786 Not available NTIS
Pepperdine Univ., Los Angeles, CA.
Impact of the BALLOTS Shared Cataloging System on the Amount of Change in the Library Technical Processing Department.
Master's thesis,
Lois M. Kershner. Apr 79, 103p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The amount of change resulting from the implementation of the Bibliographic Automation of Large Library Operations using a Time-sharing System (BALLOTS) is analyzed, in terms of (1) physical room arrangement, (2) work procedure, and (3) organizational structure. Also considered is the factor of amount of time the new system has been in use. Information resulting from a telephone survey to the head of cataloging for 44 participating BALLOTS libraries using the system for three months or more provides the basis for statistical analysis of these three aspects. Statistical analysis of the questionnaire follows chapters on a brief history of library automation for technical processing, and a library/non-library (i.e. industry) literature review or impact of automation on the work environment. Findings showed that the greatest amount of change occurred in work procedure, and the least amount in organizational structure. Libraries using BALLOTS more than 12 months perceived more change in organizational structure than those using the system for a shorter period. Appended are the questionnaire, lists of study population, library statistics, and response data by library.

ED-176 787 Not available NTIS
NTS Research Corp., Durham, NC.
Intelligence for Dissemination Service Capacity: A Conceptual Framework.
1978, 36p
Contract NIE-400-76-0166
For related documents, see ED-142 191, ED-161 444, ED-163 045, ED-169 883, IR-007 564, and IR-007 752.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The conceptual framework for determining intelligence needs for dissemination service capacity that is presented is designed to assist state education agencies in improving their abilities to provide comprehensive dissemination services to their clientele. A section on the intelligence component of this model concerns (1) users and non-users at both the individual and organizational levels; (2) impacts on individuals and organizations on local, regional, state, and federal levels; (3) levels from which intelligence is to be gathered; (4) the receivers of this intelligence; and (5) projects which need such gathered data for their services building capacity. To form the building blocks of the conceptualization of developing service capacity, four questions of need are examined: What intelligence concerning individual users and non-users is needed. What intelligence concerning organizational users and non-users is needed. What intelligence about the impact upon individual users is needed. What intelligence about the impact on organizational users is needed. Three tables and ten references are included.

ED-176 788 Not available NTIS
National Inst. of Education, Washington, DC.
Information About Users and Usages: A Literature Review,
Susan E. Hensley, and Carnot Nelson. 1979, 31p
For related documents, see ED-142 191, ED-161 444, ED-163 045, ED-169 883, IR-007 564, and IR-007 751.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Identified in this study are the factors which affect the user's capacity to seek out and utilize information, and the factors which serve as obstacles to information use. Factors relating to both organizational and individual use include level of use, user skills, and user motivation; differentiation of level of use is presented in three levels: user, potential user, and non-user. Eight states of use are later shown in Appendix A. Factors influencing user capacity in an organizational sense include structure, climate, and environment; structure refers to size, degree of centralization, and information flow. Factors in the organizational climate are identified as policy, problem-solving procedures, employee orientation, and leadership; environment encompasses budgetary considerations, maintenance, and the interface of innovations with general agency operations. The individual user analysis indicates that a person's past experiences and personality traits form his/her attitudes about using new information. Market segmentation, or breakdown of individuals according to their information needs, has applications for the design of program resources or information packages. Major segmentation variables are outlined in Appendix B, and 40 references are listed.

ED-176 789 Not available NTIS
Sierra Club, San Francisco, CA. Office of International Environment Affairs.
Information Center for International Environmental Policies. Final Report to the Sierra Club, Office of International Environment Affairs,
Marta L. Dosa. Jan 79, 76p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report is divided into two parts: recommendations for the proposed information center and a description of the feasibility study. The rationale for the center, current information problems, and the problems of the information seeker are discussed, and the proposed program is outlined. Recommendations are made concerning the center's role, subject scope, aspects of international environmental policies, interfaces with other systems, potential users of the center, functions of the center, proposed in-house database, information use seminars, information resources, and management of the center. Aspects of the feasibility study include specific objectives, time table, conceptual framework, definitions, levels of information service, characteristics of environmental literature, and assessment of need for the proposed center. Appendices present the report on the information need assessment study, which contains the questions used in the survey, and a list of additional appendices that were not reproduced due to cost limitations.

ED-176 790 Not available NTIS
South Carolina Univ., Columbia. Coll. of Librarianship.
Information Needs Assessment of Rural Groups for Library Program Development,
Daniel Barron, and Charles Curran. Feb 79, 70p
Grant OEG-007702304
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This final project report for the HEW Office of Libraries and Learning Resources presents guidelines for rural library personnel to plan library programs which are responsive to the needs of the community. The guide is designed to be free of jargon for maximum communicability to library personnel who do not hold advanced degrees. The section 'Getting Started' explains the need for awareness of rural library user needs and outlines goals of the project. Included in 'Your Community' are guidelines for collecting and analyzing demographic data. A section on 'Community Information Needs' lists 24 need categories divided by subject. Identification of special library programs and community information sources is explained in two more sections, and the 'Library Materials' section describes statistical identification of library holdings for each user need category. The final sections deal with formulating plans to answer information needs and publicize library services.

ED-176 791 Not available NTIS
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Information Systems and Networks for Technology Transfer.
Final rept.,
John Page, and Tibor Szentivanyi. 1979, 315p
PGI-79/WS/2
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Results of a survey of the information resources available in industrialized countries which might be used in a United Nations technology transfer program for developing countries are presented. Information systems and networks, organized information collections of a scientific and technical character, and the machinery used to disseminate this information are assessed in the light of their value to such a program. The main bibliographic sources are examined, as are special systems or informal information resources, and discussion of dissemination systems and networks is followed by conclusions and recommendations for future action.

Appendices include descriptions of biology, chemistry, and physics bibliographic systems; multidisciplinary systems; mission-oriented, applied science, and technology bibliographic systems; industry-specific systems; and patents and negotiable technology systems. A complete systems inventory is not intended; rather a sample is provided to assist in further work in developing the program to be charted.

ED-176 792 Not available NTIS
Utah Univ., Salt Lake City. Marriott Library.
Library Survival. Workbook in Library Skills: A Self-Directed Course in the Use of the Marriott Library. General Studies 101,
Gwen Gittins, and Carolyn Dusenbury. 1978, 101p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Marriott Library, University of Utah, Salt Lake City, UT. 84112 ($3.00).

Designed to acquaint undergraduate students at the University of Utah with basic library resources and materials, the program of instruction presented can be used as a self-paced tool either in course related instruction or as an independent offering. A section containing floor plans of the University's Marriott Library illustrates the location of materials and service areas. Chapters for study cover the card catalog, the stacks, periodicals, newspaper indexes, book review indexes, dictionaries, biographies, encyclopedias, almanacs, atlases, documents, and non-print reference services. Multiple sets of questions for each chapter are available so that no student in a given library skills course has the same assignments. Brief guidelines for research are included, as well as a workbook evaluation sheet and pages for correction notes.

ED-176 793 Not available NTIS
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
A Mathematical Model of the Illinois Interlibrary Loan Network.
Final rept. no. 11,
William B. Rouse, and Sandra H. Rouse. Jul 79, 21p
Prepared in cooperation with Illinois State Library, Springfield. For related documents, see ED-134 201, ED-160 054, ED-163 931, and IR-007 728.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A research project sponsored by the Illinois State Library had two goals: to develop a set of mathematical models suitable for predicting the impact of alternative library network policies on network performance, and to demonstrate through series of case studies that the methodology developed could feasibly be applied to real library networking problems. Initial research entailed formulating an understanding of the Illinois Library and Information Network and defining operating policies and network performance. Incorporated in an interactive policy analysis program, the model developed was applied to analyzing resource allocation within individual libraries. Three case studies conducted on the interlibrary loan and reference services of three library systems yielded recommendations and request routing suggestions for each. In addition to development and application of the model, three other efforts were pursued: (1) designing a model-based, integrated online management information system, (2) assessing the impact of automated circulation systems on network operations, and (3) studying reimbursement for services. It was felt that the methodology's versatility was illustrated, and that the feasibility of incorporating the model-based approach into an online management information system was demonstrated. A bibliography lists sources in which the topics discussed are considered at length.

ED-176 794 Not available NTIS
North Texas State Univ., Denton.
A Model for Service to the Elderly by the Small/Medium Sized Public Library.
Master's thesis,
Stephen R. Jeffries. 1977, 83p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Center for Studies in Aging, North Texas State Univ., P.O. Box 13438, Denton, TX. 76203 ($2.50).

Citing the American Library Association's 1964 statement of libraries' responsibilities to the aging, this paper presents a needs assessment of the elderly and suggests methods by which public libraries can attempt to meet some of these needs, e.g., barrier-free design, programs, materials, and services. The needs assessment of older users provides background material on 10 areas: marital status and living arrangements of older persons, economic security, work and retirement, health, education, dependency, nutrition, consumer fraud, recreation, and leisure. A guide for library service covers such topics as obtaining board support, surveying user needs, collectiong and disseminating information, publicizing programs, implementing programs, monitoring and evaluating services, and dealing with possible problems. In addition to a bibliography for each chapter, a list of how-to resources provides sources of funding, a model core collection, specialized materials, additional bibliographic sources, and relevant organizations, associations, and agencies. A general bibliography is also included.

ED-176 795 Not available NTIS
Association of Research Libraries, Washington, DC.
National Planning for Bibliographic Control. Minutes of the Ninety-Fourth Meeting, May 10-11, 1979 at Cambridge, Massachusetts.
May 79, 161p
For related document, see IR-007 153.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Association of Research Libraries, 1527 New Hampshire Avenue, N.W., Washington, DC. 20036 ($5.00 per issue for members, $7.50 per issue for non-members).

The minutes of this meeting provide the texts of the seven addresses given during the program sessions, as well as the discussions that followed each session: C. Lee Jones, 'Bibliographic Service Development Program'; Henriette D. Avram, 'The Role of the Library of Congress in National Planning for Bibliographic Control'; James F. Govan, 'Implications for Research Libraries'; Gary E. Strong, 'The Washington Library Network'; Frederic G. Kilgour, 'OCLC, Inc.'; Edward E. Shaw, 'The Research Libraries Information Network'; and Robin Braithwaite, 'The University of Toronto Library Automation System.' Also included is the special presentation, by Jaroslav Pelikan, 'The Wisdon of Prospero.' The business meeting portion of the document contains various reports, e.g., special reports on the National Commission on Libraries and Information Science and the National Endowment for the Humanities, and the appendices include the annual report of the Office of Management Studies; lists of the meeting's attendees, officers, board of directors, committees and task forces of the association, and association members; and the auditor's report.

ED-176 796 Not available NTIS
Library of Congress, Washington, DC. Congressional Research Service.
Technology Supported Information Systems: Selected References,
Robert I. Chartrand, and Jean Paul Emard. 15 Jan 79, 19p 79-16-SPR
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The materials listed were selected to provide insights into the role of information systems and technology in present day American society. Emphasized throughout the bibliography are the issues of right to privacy, research and development reporting, information access and policy, and legislator reliance on information services. Citations are presented in six categories: (1) tools and techniques; (2) governmental management; (3) the legislator; (4) social implications; (5) bibliographies, encyclopedias, dictionaries, and directories; and (6) related periodicals. Each section contains from 13 to 26 references with Library of Congress call numbers.

ED-176 797 Not available NTIS
Wayne State Univ., Detroit, MI. Univ. Libraries.
Acceptability of Microfiche Copy in Lieu of Paper Copy of Current Journals.
Technical paper,
Vern M. Pings, and Lothar Spang. May 79, 23p
TP-4
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report presents and discusses the findings of a study, undertaken at the Education Library of Wayne State University in 1977, that tested library user acceptance of a selected group of current journals in a microfiche format. Problems and conditions of the study, the environment of the Education Library, and methodology are considered; data, in the form of statistical tables and charts, are provided for the three consecutive academic quarters of the study. Library users are categorized as undergraduate, graduate, faculty, and other.

ED-176 798 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Secondary Education.
Acquisition and Applications of Three Microcomputers by the Department of Secondary Education. The Illinois Series on Educational Application of Computers,
Jeff Case. Jan 79, 15p
For related documents, see ED-138 286-288, ED-138 290, and ED-142 199.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report describes the experience of the Department of Secondary Education in acquiring and applying three microcomputers: MSEA, (Micro-Computer System for Educational Applications), North Star HORIZON, and VECTOR. MSEA was designed as a central facility that would be capable of providing all types of educational computing research and service, and would include all important computer peripherals. The North Star HORIZON microcomputer was chosen for its portability and power, to be used in workshops and other outreach in the schools and community colleges. The VECTOR microcomputer together with special software was designed and installed for the Office of the Graduate Dean in the College. Each of these microcomputers can be used for instructional or administrative applications and for research, teaching, or service to students and staff. The implementation of these systems has contributed not only to development of staff and computer uses in the College of Education, but to several research and development projects in the department.

ED-176 800 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
The CEDAR Project,
N. J. Rushby. Oct 78, 9p
Text in English, Dutch, German, Italian and French.
For related documents, see IR-007 789 and IR-007 826-829.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper describes the CEDAR Project, which is designed to encourage and facilitate the development and effective use of educational computing within Imperial College, the University of London, and elsewhere. The project supports teaching staff by providing an information service and demonstration facilities, by developing and implementing educational computer programs, and by assisting with educational development and training. References and a list of 18 publications and reports from the project are included.

ED-176 803 Not available NTIS
York County Board of Education, Aurora (Ontario).
A Computer-Based Catalogue Linking the PRECIS Subject Indexing System to School Library Materials: Building a Model for an Ontario-Wide Information Network for School Libraries Using PRECIS: A Developmental Research Project,
Brian Burnham, and Irene McCordick. Oct 78, 48p
Prepared in cooperation with Ontario Dept. of Education, Toronto.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Two versions of this Preserved Context Indexing System (PRECIS)/school library materials project, funded by the Ontario Ministry of Education, are presented: a narrative report and a technical report. Designed for interested readers who are not familiar with information science terminology, the narrative report summarizes the development of this computerized system for producing subject catalogs. The landmark PRECIS implementation at Aurora High School (Canada), other international applications, and catalog form/content development are discussed, leading to lists of immediate and long range objectives. The technical report treats the same topics with a more specific technical account including background, project setup and personnel, the automation process, products of the system, information dissemination, and systems development. Objectives are analyzed and their attainment evaluated, followed by recommendations. A glossary of terms used in the technical report, bibliography, a sample PRECIS printout, and a list of related conferences, workshops, and consultations complete the report.

NUREG-0540-V-2-5 PC **A24**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, May 1-31, 1980. Volume 2, Number 5.
Aug 80, 572p
See also Volume 2, Number 4, NUREG-0540-V-2-4.

The document is a monthly publication containing descriptions of information received and generated by the US NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through the U.S. Department of Energy's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document contains the following indexes: Personal Author Index, Corporate Source Index, and Report Number Index.

PB80-155062 PC **A03**/MF **A01**
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Translations from the Scientific Literature, Annotated Bibliography, 1978-79.
Jun 80, 47p
See also report dated Jun 78, PB-278 430-T.

This bibliography for the years 1978-79, supplements previous issues, which are listed below. This supplement is published to provide continued access to translations that were done under the National Science Foundation's Special Foreign Currency Science Information Program and that are available from the National Technical Information Service. Previous bibliographies may be ordered from NTIS as follows: 1960-73 - order as PB-236 385, 1974-75 - order as PB-253 493, and 1976-77 - order as PB-278 430-T.

PB80-205057 PC **A05**/MF **A01**
Washington State Joint Ad Hoc Science and Technology Planning Committee, Olympia.
Joint Ad Hoc Science and Technology Planning Committee, Report of the Washington State Legislature (SSET).
Final rept.,
J. Bricker. Feb 80, 86p NSF/RA-800075
Grant NSF-ISP78-12732

In assessing the options for providing S & T information to the Legislature, a review of current literature was conducted, and other state legislatures with similarities to Washington's were surveyed. Two states, Arizona and Minnesota, were selected for examination, due to similarities in staffing patterns and other relevant legislative functions and structure. A report was prepared on these examinations and is included in this study. Based on these and other considerations, both committee staff and the Technical Advisory Committee recommended an S & T information system structure with certain parallels to the Arizona and Minnesota patterns. The recommended S & T Office could serve several functions, including responding to legislative S & T inquiries, and organizing workshops on specific issues. The Joint Committee determined that S & T information should be made available to support the legislative process in various ways: quick informational responses, position papers, expert testimony, and concerted workshops on issues of major S & T impact. Both as a system test and as a means of providing needed S & T information to the Legislature, the Joint Committee sponsored an appropriate S & T workshop on issues confronting the Legislature. The issue of nuclear waste management disposal was examined in a demonstration legislative workshop. Results of the workshop are presented. Finally, recommendations for the final system design are offered.

PB80-205545 PC **A03**/MF **A01**
New York State Library, Albany. Legislative and Governmental Services.
New York State Library Services to the Legislature.
Jan 79, 41p
Prepared by State Univ. of New York at Albany. State Education Dept.

The handbook is designed to assist legislators and legislative staff in using the New York State Library more effectively. It provides a description of what the Library is, what it has to offer, and how to use it. Priority service is given to legislators and their staff. The Library's goal is to provide fast, courteous service from all sections at all times.

PB80-205669 PC **A04**/MF **A01**
Participation Systems, Inc., Winchester, MA.
Networking, Legitech Experiments and the Development of Politechs,
Chandler Harrison Stevens. Jun 80, 58p NSF/RA-800096
Grants NSF-DSI77-27940, NSF-DSI77-17838

Politechs is a communication system which supports political decisionmaking through the exchange of technical information needed to clarify policy options. Each participant potentially is an inquirer/selector/consumer and a responder/editor/producer. Information exchange within this system takes various forms. Electronically, inquiries and responses are exchanged through computer terminals connected by phone to Politechs. The report also evaluates the Politechs-on-Electronic Information Exchange System (EIES). Additionally, a discussion of the Northeast Networkshop conference on the Legitech experiment on EIES is presented.

PB80-205909 Not available NTIS
National Bureau of Standards, Washington, DC.
Managing Revolutions - Coping with Evolving Information Technologies.
Final rept.,
P. W. Berger. 1980, 26p
Pub. in Proceeding of the Annual Conf. of the Special Libraries Association (71st), Washington, DC., 26p, 10 Jun 80.

The report presents an overview of the impacts - past, present and future - of the newer information technologies on special libraries.

PB80-928114 PC **E09**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of Soviet Officials, Volume II: RSFSR Organizations; a Reference Aid.
Jul 80, 236p CR-80-13212
Supersedes NTISUB/E/281-005.Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928100.

This reference aid identifies individuals who hold positions in selected party, government and public organizations in the Russian Soviet Federated Socialist Republic (RSFSR), the largest of the USSR's constituent republics. This volume is the second of a series of four. Volumes I, III and IV cover national organizations, other Union Republics and scientific research organizations respectively.

5C. Economics

AD-A087 038/6 PC **A02**/MF **A01**
Air Force Communications Command Scott AFB IL
Comparative Costs of Base Administrative Telephone Service Provided by Commercial and Government Telephone Plants.
Final rept.,
William J. Donahue. Nov 79, 19p Rept no. AFCC-14-ORR-79

The purpose of the study was to evaluate the comparative cost of AF base administrative telephone service provided by government and commercial telephone plants. Fiscal year 1979 costs were surveyed and compared for 10 commercial and 10 government telephone plants. Cost data was normalized by using annual cost per main station. Study revealed that for existing commercial and government plants, there was no statistical difference in the annual Operations and Maintenance cost per main station. When indirect and overhead costs are allocated to the telephone plants then the annual cost per main station for a government plant is significantly higher than like cost for commercial plants.

AD-A087 192/1 PC **A02**/MF **A01**
Battelle Columbus Labs OH
Forecast of Future Ohio River Basin. Waterway Traffic Based on Shippers Surveys.
Summary rept.,
Harry Collis. Sep 79, 23p
Contract DACW69-78-C-0059
See also AD-A087 193.

This report to the Corps of Engineers describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity group and origin-destination areas from 1975 to at least 1990. The study and the 1975-1990 traffic projections discussed in this report were developed by surveying all waterway users in the Ohio River Basin through a combined mail survey and personal interview approach. The purpose of the survey was to obtain an estimate from each individual shipper of his future commodity movements by specified origins and destinations, as well as other associated traffic information.

AD-A087 193/9 PC **A10**/MF **A01**
Battelle Columbus Labs OH
Forecast of Future Ohio River Basin, Waterway Traffic Based on Shippers Surveys.
Final rept.,
Harry Collis. Sep 79, 215p
Contract DACW69-78-C-0059
See also AD-A087 192.

This report to the Corps of Engineers describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity group and origin-destination areas from 1975 to at least 1990. The three study projections, in conjunction with other analytical tools and system information, will be used to evaluate specific waterway improvements to meet short and long-term navigation needs. The output from these studies will serve as input to Corps' Inland Navigation Simulation Models to help analyze the performance and opportunities for improvement of the Ohio River Basin Navigation System. These data will be used in current

studies relating to improvement of Gallipolis Locks, the Monongahela River, the Upper Ohio River, the Kanawha River, the Lower Ohio River, the Cumberland River and the Tennessee River, as well as other improvements.

AD-A087 194/7 PC **A15**/MF **A01**
CONSAD Research Corp Pittsburgh PA
Projecting the Demand for Ohio River Basin Waterway Traffic Using Correlation and Regression.
Final rept.
Jan 79, 330p
Contract DACW69-78-C-0018
See also AD-A087 195.

This report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands of all of the navigable waterways of the basin. Each report contains information on past and present waterborne commerce in the basin and projections by commodity group and origin-destination areas from 1975 to at least 1990. This report and the 1975-1990 projected traffic demands discussed in it were developed by correlating the historic waterborne commodity flows on the Ohio River Navigation System with various indicators of regional and national demands for the commodities. The demand variable (s) which appeared to best describe the historic traffic pattern for each of the commodity groups was selected for projection purposes. The historic and projected values for the demand variables are based upon the 1972 OBERS Series E Projections of National and Regional Economic Activity.

AD-A087 195/4 PC **A02**/MF **A01**
CONSAD Research Corp Pittsburgh PA
Projecting the Demand for Ohio River Basin Waterway Traffic Using Correlation and Regression.
Summary rept.
Jan 79, 20p
Contract DACW69-78-C-0018
See also AD-A087 194.

This report to the Corps of Engineers describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands of all of the navigable waterways of the basin. Each report contains information on past and present waterborne commerce in the basin and projections by commodity group and origin-destination areas from 1975 to at least 1990. The three study projections, in conjunction with other analytical tools and system information, will be used to evaluate specific waterway improvement to meet short and long-term navigation needs. The output from these studies will serve as input to Corp's Inland Navigation Simulation Models to help analyze the performance and opportunities for improvement of the Ohio River Basin Navigation System. These data will be used current studies relating to improvement of Gallipolis Locks, the Monongahela River, the Upper Ohio River, the Kanawha River, the Lower Ohio River, the Cumberland River and the Tennessee River, as well as other improvements.

AD-A087 232/5 PC **A02**/MF **A01**
Forest Products Lab Madison WI
EVALUE: A Computer Program for Evaluating Investments in Forest Products Industries.
Forest service general technical rept.,
Peter J. Ince, and Philip H. Steele. Jan 80, 15p
Contract FSGTR-FPL-30

EVALUE, A FORTRAN program was developed to provide a framework for cash flow analysis of investment opportunities. EVALUE was designed to assist researchers in evaluating investment feasibility of new technology or new manufacturing processes. This report serves as user documentation for the EVALUE program. EVALUE is briefly described and notes on preparation of a data deck are provided. Sample program input, sample output, and a complete listing of the program are provided. (Author)

DIB-80-09-500 PC**$10.00**/MF **A01**
Kindel (K. W.), Berlin (Germany, F.R.).
Survey of the Market for Medical Equipment in Switzerland.
Foreign market survey rept.
Mar 80, 88p
U.S. sales only for 8 months. Available to foreign addressees in Apr 81.

The market research was undertaken to study the present and potential US share of the market in Switzerland for medical equipment; to examine growth trends in Swiss end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Switzerland were also reviewed.

DIB-80-09-501 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
Asian Campaign Market Research Study, Plastics and Rubber Products Production: Equipment and Materials. (Singapore).
Foreign market survey rept.
Jul 80, 38p
U.S. sales only for 8 months. Available to foreign addressees in Apr 81.

The market research was undertaken to study the present and potential US share of the market in Singapore for plastics and rubber products production equipment and materials; to examine growth trends in Singaporean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Singapore were also reviewed.

DIB-80-09-502 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
Survey of the Market for Computers and Related Equipment in the Netherlands.
Foreign market survey rept.
May 80, 84p
U.S. sales only for 8 months. Available to foreign addressees in Apr 81.

The market research was undertaken to study the present and potential US share of the market in the Netherlands for computers and related equipment; to examine growth trends in Dutch end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in the Netherlands were also reviewed.

DIB-80-09-503 PC**$10.00**/MF **A01**
American Consulate General, Madras (India).
Market Research Report on Machine Tools and Related Equipment (India),
Foreign market survey rept.
A. V. Subramanian, and M. Francis. Jun 80, 138p
U.S. sales only for 8 months. Available to foreign addressees in Apr 81.

The market research was undertaken to study the present and potential US share of the market in India for machine tools and related equipment; to examine growth trends in Indian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in India were also reviewed.

DIB-80-09-504 PC**$10.00**/MF **A01**
Lindsey (Richard P.), Sao Paulo (Brazil).
Electronic Components (Brazil).
Foreign market survey rept.
Jul 80, 34p
U.S. sales only for 8 months. Available to foreign addressees in Apr 81.

The market research was undertaken to study the present and potential US share of the market in Brazil for electronic components; to examine growth trends in Brazilian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Brazil were also reviewed.

PB80-203094 PC **A21**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Sociology.
The Social Impact of Industrial Structure on Working Conditions.
Rept. for 1 Mar 79-31 Aug 80,
Randy Dale Hodson. May 80, 488p
Grant DL-91-55-79-12
Doctoral thesis.

The topic of the research is the impact of economic structure on two individual level work place outcomes, earnings and job satisfaction. Economic structure is measured at both the company and industry levels and continuous as well as sectoral measures of economic structure are developed. The major findings of this study include the discovery of a negative impact of industrial concentration on individual earnings in equations which hold constant other dimensions of economic structure. In addition, plant size is found to have a greater positive impact on individual earnings than company size and to account for much of the impact of the latter variable.

PB80-204613 PC **A14**/MF **A01**
Daniels (Belden), Cambridge, MA.
Theory and Practice in the Design of Development Finance Innovations.
Final rept.,
Belden Daniels, and Michael Kieschnick. 10 Jul 78, 308p EDA-ERD-80-156
Grants EDA-PF-834, EDA-99-7-13443

The comprehensive monograph summarizes the limits of empirical evidence and literature available on the impact of capital markets on urban and regional economic development. It develops a conceptual framework within which new financing programs can be considered. Acknowledging the limits of knowledge in this area, it outlines an agenda for future research.

PB80-205008 PC **A06**/MF **A01**
Nevada Legislative Counsel Bureau, Carson City. Legislative Commission.
Problems Concerning Professional Liability Insurance.
Oct 78, 105p BULL-79-9

The report contains the findings and recommendations for a study conducted by the Nevada State legislature commission concerning professional liability insurance. Only that data which bears directly upon the recommendations is included.

PB80-205818 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
A Review of Recent Energy Price Projections for Traditional Space and Process Heating Fuels in the Post-1985 Period.
Technical rept.,
William Barron. Apr 80, 49p JHU/APL/GEMS-007, JHU/APL/QM-80-070
Contracts DOE-EX-76-A-36-1008, DE-AI01-79ET27025
Also pub as Johns Hopkins Univ., Baltimore, MD. Center for Metropolitan Planning and Research Rept. no. MCGER-80-001.

In this report, the most recent price projections that have been published for distillate heating fuels, natural gas, and electricity are reviewed. The projections include those made by the Energy Information Administration of DOE, the Brookhaven National Laboratory, Foster Associates, and SRI International.

PB80-206568 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Housing Costs in the United States and Other Industrialized Countries, 1970-1977,
E. Jay Howenstine. Sep 79, 30p HUD/PDR-526, HUD-0001471

A study of the United States and several other industrialized countries throughout the world was conducted for the period 1970-1977 to compare average annual rates of increase in the cost of new housing and rents. During the study period, U.S. housing costs showed comparatively low rates of increase. The U.S. was the lowest of all countries in average annual rate of increase in building labor costs and the average annual rate of rent increase. However, the importance of the low labor cost factor may be somewhat diminished by the increasing disappearance of onsite labor costs into higher material costs.

PB80-206626 PC **A03**/MF **A01**
Harvard-MIT Joint Center for Urban Studies, Cambridge, MA.
Equal Credit Opportunity: Accessibility to Mortgage Funds by Women and by Minorities. Summary of Results,
Robert Schafer, and Helen F. Ladd. May 80, 48p HUD/PDR-551, HUD-0001499
Contract HUD-H-2879

A summary is presented of results obtained from an analysis of data maintained by State-regulated lending institutions in California and New York to determine whether such institutions discriminate in the distribution of mortgage funds. The study takes into account discrimination in three types of lender practices: (1) decisions to approve, modify, or deny mortgage applications; (2) setting of mortgage terms (i.e., interest rate, maturity, loan-to-value ratio, and loan fees); and (3) appraisal practices.

PB80-206857 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Mortgage Revenue Bonds: Tax Exemption with a Vengeance,
Patric H. Hendershott. 1980, 45p 1371-01, HUD-0001465
Contract HUD-H-2893

The paper provides estimates of both the productivity loss and the increase in the Federal deficit caused by the growth in tax-exempt mortgage revenue bonds (MRB's). Two alternative levels of MRB's are considered: a legislatively constrained volume of $40 billion (to provide only low-income housing) and an unconstrained (excepting marketplace realities) volume. The analysis of these two volumes of MRB's encompasses three tasks: (1) a determination of the impact on financial markets, emphasizing effects on the yields of tax-exempt securities, home mortgages, and other taxable securities; (2) an assessment of the impact of changes in capital market rates on the user costs of capital or investment hurdle rates for owner-occupied housing and other components of nonfinancial capital; and (3) a measure of the impact of financial market changes and the reallocation of the nonfinancial capital stock on the Federal budget.

PB80-206865 PC **A05**/MF **A01**
Urban Inst., Washington, DC.
Mortgage Revenue Bonds and Metropolitan Housing Markets,
C. Duncan MacRae, David I. Rosenbaum, and John A. Tuccillo. May 80, 90p 1371-02, HUD-0001501
Contract HUD-H-2893

The report concerns the effect of mortgage revenue bonds on housing market configurations, homeownership rates, and the distribution of housing activity across metropolitan areas. Using the Urban Institute housing market model, it presents simulations of the impact of mortgage revenue bonds, as well as of alternative homeownership subsidies, on metropolitan housing markets. The model was developed to simulate decade-long growth within the housing market of a metropolitan area. The key exogenous variables are the price of newly constructed housing, the quantity of housing services provided at the beginning of the decade, and incomes at the end of the decade. Different sections of the report present the theory on which the model is based as modified to simulate the effects of mortgage revenue bonds; data sets used to test the policies considered; and results of the model simulations and comparison of different policy impacts.

PB80-207418 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume 3, Number 15, July 28, 1980.
Bi-weekly pub.
28 Jul 80, 59p
See also Volume 3, Number 13, PB80-197858.
Paper copy available from Supt. of Docs.

Contents:
- Larger U.S. trade deficit seen in 1980;
- Canada--market prospects mixed as economy sags;
- Western Europe--another banner year is forecast;
- Communist countries--mixed prospects for business;
- Near East/North Africa--market remains dynamic;
- Far East-South Asia--sales prospects are excellent;
- Sub-Sahara Africa--market outpaces rest of world;
- Latin America--U.S. sales should top $30 billion.

PB80-207921 PC **A10**/MF **A01**
Bureau of Economics Analysis, Washington, DC. Interindustry Economics Div.
The Detailed Input-Output Structure of the U.S. Economy: 1972. Volume I. The Use and Make of Commodities by Industries.
Jan 80, 212p BEA/IED-80-02

The first table shows for 1972 the dollar value of the use of commodities by industries, the sales to final markets, and the value added originating in each industry. Each row of the table displays the distribution of the output of each commodity (goods and services) named at the beginning of the row to each of the industries and final users named across the top of the table. The columns show the value of each industry's current consumption (input) of raw materials, semi-finished products, and services and its value added in production. The second table shows the industries producing each commodity and the commodities produced by each industry.

PB80-208200 PC **A17**/MF **A01**
Office of Technology Assessment, Washington, DC.
Technology and Steel Industry Competitiveness.
Jun 80, 380p OTA-M-122
Errata sheet inserted.

The report focuses on the creation and adoption of advanced technology in the U.S. steel industry. It examines nontechnological factors that shape the environment in which new technology is created and adopted, it analyzes the costs and benefits of specific Federal policy options, and it constructs several scenarios for the next ten years to assess how these options would affect the industry and the Nation. Opportunities for new technologies are identified, and technology-related policy options are presented.

PB80-208861 PC **A05**/MF **A01**
Public Interest Economics Center, Washington, DC.
Economic Aspects of Joint Research and Development Ventures in the Private Sector.
Final rept.,
Steve Buchanan. Aug 79, 78p NBS-GCR-ETIP-79-69
Contract NBS-4-36113

The study reviews the literature on the economics of technological innovation. It then lays out a methodological approach to evaluating the effects of permitting large firms to pool their R&D efforts. These include both the potential short-run benefit of increased innovation and the long-run costs of limited competition and decreased innovative capacity. The literature review summarizes knowledge on three areas: the innovative process, rationales for market failure to provide sufficient innovation, and the interrelation of firm size, market structure, and level of innovative activity. The study then outlines a cost-benefit approach to evaluating proposed R&D consortia. A three-page bibliography is included.

PB80-208911 PC **A07**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Definitions and Conventions of the 1972 Input-Output Study.
Staff paper,
Philip M. Ritz. Jul 80, 150p BEA-SP-80-034

The report, prepared for use with the 1972 input-output (I-O) study, is an update of similar reports prepared for the 1967 and 1963 I-O studies. The basic text discusses I-O as an accounting system, relates I-O to the national income and product accounts, shows the mathematical system for developing total requirements tables, defines concepts, and explains conventions adopted for the study. Appendix A defines industries and commodities identified in the study. Appendix B provides methods and sources for preparing the 1972 I-O tables.

PB80-209711 PC **A02**/MF **A01**
International Customs Tariffs Bureau, Brussels (Belgium).
Pakistan: International Customs Journal. 7th Edition, Supplement 1, Year 1980-1981.
Bulletin.
May 80, 23p BULL-44-SUPPL-1
See also 7th Edition, PB80-166168.

The reports present authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of customs duties and exemptions applicable to goods imported into or exported from the country.

PB80-210198 PC **A07**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Three Approaches to Input-Output Modeling in NSF-RANN Regional Environmental Systems Projects. Volume V.
Final rept. 15 Aug 77-31 Aug 79,
Oscar Fisch, Steven I. Gordon, R. Given, and R. Crane. Aug 79, 129p NSF/RA-790491
Grant NSF-ENV77-15020
See also Volume 1, PB80-180615.

The report presents an in-depth analysis of three projects in which current state-of-the-art methodologies are applied to the solution of technical planning problems at state, regional, and local levels. Among others, an evaluation was done of alternative coastal zone management policies in Texas. The objective was to transfer applicable practices to Ohio. The first project dealt with development of a methodology to resolve the economic expansion-environmental dilemma, replacing subjective evaluation with information produced through scientific analysis. The second project concerned regional analysis and management of environmental systems to provide information for making land-use decisions. The third project involved devising a series of models called the Regional Activities Model comprising nine computer programs which calculate economic conditions and predict the residuals impacts of economic activities. All three projects utilized Input/Output (I-O) analysis. I-O models are described together with the survey methods used to modify national or state I-O coefficients for use in a region. A detailed review describes each project and the application of I-O. Application of the methodology to Ohio appears quite limited.

5D. History, Law, and Political Science

AD-A087 025/3 PC **A10**/MF **A01**
Operational Research and Analysis Establishment Ottawa (Ontario)
Spain: NATO or Neutrality,
H. P. Klepak. Apr 80, 223p Rept no. ORAE-EXTRA-MURAL PAPER-11

Abstract in French. Also available as National Security Series 1/80.

This report examines the implications of Spain's entry into NATO from both the perspective of the Alliance and that of Spain. In the NATO context the author sets out the political and military advantages and disadvantages for the Alliance. From a Spanish perspective, the author concentrates on elaborating the various countervailing domestic political factions involved with the Spain and NATO decision. (Author)

AD-A087 113/7 PC **A03**/MF **A01**
Center for Naval Analyses Alexandria Va Inst of Naval Studies
Superpower Security Interests in the Indian Ocean Area.
Professional paper,
Richard B. Remnek. Jun 80, 33p Rept no. CNA-PP-285

No abstract available.

PB80-205529 PC **A03**/MF **A01**
Illinois Law Revision Commission, Chicago.
Report to the 80th General Assembly of the State of Illinois.
Jun 77, 28p

The document is the first report of the Illinois Law Revision Commission. This commission has undertaken the task of reviewing Illinois statutory laws and making all necessary corrections and revisions.

PB80-208820 PC **A03**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Administrative Procedures Required for Development Permits in Hawaii.
Technical supplement,
Jonathan M. Davidson. Jan 80, 31p TS-18, NOAA-80061208
Grant NOAA-04-8-M01-333
Prepared in cooperation with Washington Univ., Seattle. School of Law.

This report focuses on the interplay between applicants and regulatory agencies in the procedural requirements for development permit programs in Hawaii. It discusses how and when the Hawaii Administrative Procedure Act (HAPA) affects agency decisions to grant or deny development permission, and the circumstances in which agencies are required to provide adjudicatory, 'contested case' hearings before a final determination. In those situations in which an agency is required by its authorizing statute to provide a hearing for development permit applications, the paper indicates whether the adjudicatory 'contested case' prodedures of HAPA apply. Since this question is not answered by Hawaii decisions, the paper relies on cases from other states for possible precedential and predictive value.

PB80-208929 PC **A08**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Guidelines for the Hawaii CZM (Coastal Zone Management) Law.
Technical supplement.
Sep 78, 173p TS-13, NOAA-80061203
Prepared in cooperation with Hawaii Univ., Honolulu. Pacific Urban Studies and Planning Program. See also PB80-208937.

This report represents a documentation of the process by which the guidelines proposed for Hawaii's Coastal Zone Management program were developed. Section 1 contains a discussion of the variety of purposes and forms guidelines may take, as well as an analysis of the necessity for establishing guidelines in the resource/management categories of Hawaii's CZM law. The first of the discussion papers focuses on the nature of guidelines. The remaining seven papers deal with the categories of objectives and policies outlined in the Hawaii CZM Act of 1977 including historic resources, economic uses, scenic and open space resources, managing development, coastal hazards, coastal ecosystems, and recreational resources. Section 2 contains a compilation of the guidelines outlined in the eight discussion papers.

5E. Human Factors Engineering

AD-A087 341/4 PC **A03**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Critical Interfaces between Environment and Organism in Class A Mishaps: A Retrospective Analysis.
Final rept. 30 Aug-27 Dec 78,
Stan R. Santilli. Jun 80, 41p Rept no. SAM-TR-80-3

Aircraft-mishap prevention efforts in the past have been extremely successful. Since 1970 the mishap-rate decrease has leveled off. Most experts agree, however, that it can be further reduced. This study focuses on the human-factors aspects that have consistently played a prominent role in mishap causation but only recently have received significant scrutiny. The approach taken in this study has as its premise that both the environment and the organism bring with them a certain degree of mishap potential and that a mishap occurs as a result of the additive effects, or critical interfaces, of the two. Determining these critical interface by retrospective analysis of past mishaps is the method used here, the immediate goal being to identify more clearly the root cause of human-factors mishaps. Recommendations are offered for future efforts to avoid these critical interfaces or to decrease the mishap potential inherent in the environment and the organism. (Author)

5F. Humanities

PB80-205503 PC **A07**/MF **A01**
Oklahoma Dept. of Transportation, Oklahoma City. Planning Div.
The Dawson Site (My-140): An Archaic Workshop in Northeastern Oklahoma.
Highway archaeological survey paper no. 5,
Timothy G. Baugh. 1978, 135p

The Dawson site, My-140, was excavated during a five week period in May and June, 1977, by the Oklahoma Highway Archaeological Survey. The excavation was deemed necessary since the proposed alignment of the Lindsey-Mayes Bridge Project would endanger the site. The Dawson site was the first single component Archaic workshop to be found in northeastern Oklahoma. The cultural remains were analyzed in the framework of a lithic reduction trajectory to more fully determine the nature of the activities at the site. The primary utilization of My-140 probably occurred about 4000 B.P. The Dawson site may have repeatedly served as a lithic collection and reduction station during the Middle to Late Archaic periods.

PB80-210255 PC **A19**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis. Energy and Coastal Zone Administration.
Prehistoric Archeological Resources in the Maryland Coastal Zone. A Management Overview.
Steve Wilke, and Gail Thompson. Aug 77, 449p NOAA-80061211

An overview of the current status of prehistoric resources in the Maryland zone is presented. The study objectives are to undertake a program of archival research, fieldwork, and data analysis. Information is summarized on the environment of the Maryland coastal zone, emphasizing its changes during the time that prehistoric occupation is likely to have taken place and the implications these changes have had for prehistoric activities and the subsequent preservation of prehistoric remains. In addition, what is known of prehistoric occupation of the area is summarized. The methods and results of fieldwork conducted to supplement existing information on the prehistoric resources of the coastal zone is presented.

5G. Linguistics

AD-A087 250/7 PC **A03**/MF **A01**
University of Southern California Marina Del Rey Information Sciences Inst
Toward a Speech Act Theory for Natural Language Processing.
Research rept.,
William C. Mann. Mar 80, 33p Rept no. ISI/RR-79-75
Grant NSF-MCS78-07410

this report explores the prospects for using concepts from Speech Act Theory in the design of processes that operate on natural language. The potential benefits of creating processes to identify the illocutionary force of utterances in text are particularly significant. These benefits include systematic derivation of implicit communication, identification of relations between text and prior text, and the possibility of applying existing action-oriented knowledge within AI to new natural language processing tasks. The report not only explores these benefits and the potential uses of Speech Act Theory but also exhibits some simple processes for identifying illocutionary forces and for simulating the effects (including much implicit communication) of speech acts. (Author)

5H. Man-Machine Relations

AD-A087 016/2 PC **A06**/MF **A01**
McFann Gray and Associates Inc Monterey CA
Personnel Requirements Consideration in Major Weapon System Acquisition. Research Planning Report.
Final rept. Mar 79-Mar 80,
Fred L. Finch, Kay E. Rigg, and Burl B. Gray. Mar 80, 106p ARI-RN-80-16
Contract MDA903-79-C-0277

The objective of this effort was to produce a plan of research for development of a model and methodology for deriving a direct relationship between aptitude measures and task analysis procedures early in the process of weapon system research, development, and acquisition. A literature review indicated that past attempts to link behavioral requirements with human attributes have not been successful. A recent effort suggested further that these approaches are ultimately not feasible. That effort, as with all the others reviewed, would require a highly specialized and lengthy application for most tasks in every job in every new system and for each phase within the system. Such procedures are slow and expensive. There is a need for a procedure which can be applied in a direct and simple manner. The current effort has resulted in a research plan based upon a conceptual design for a branching decision logic that will provide measures of personnel requirements while avoiding detailed analysis of nonrelevant factors. Implementation of this plan will result in construction and pilot testing of a computer based branching decision logic in 1980-81 and field testing and evaluation in 1981-82. (Author)

AD-A087 355/4 PC **A03**/MF **A01**
Krannert Graduate School of Management Lafayette IN
Future Directions for Decision Support.
Technical rept.,
Robert H. Bonczek, Clyde W. Holsapple, and Andrew B. Whinston. Jun 80, 35p ARO-16231.2-EL
Contract DAAG29-79-C-0154
Prepared in cooperation with Illinois Univ.

A formal, generic description of decision support systems is introduced. This description views a decision support system as having three principal components: a language system, a knowledge system and a problem processing system. Several systems are described which fit the generic DSS idea, but which are (for the most part) not the customary kinds of systems encountered in business applications. Nevertheless, the concepts and techniques employed in these systems can make important contributions to the emergence of more powerful business-oriented decision support systems. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A086 924/8 PC **A02**/MF **A01**
Army Administration Center Fort Benjamin Harrison IN
Literacy as a Measure: An Argument for High Quality Military Manpower,
Juri Toomepuu. 1978, 7p
Pub. in National Defense, Jnl. of the American Defense Preparedness Association, v63 n352 p-47-50, 56 Jan-Feb 79.

No abstract available.

AD-A086 938/8 PC **A02**/MF **A01**
Army Soldier Support Center Fort Benjamin Harrison IN
Soldier - The Decisive Factor,
Juri Toomepuu. 1980, 9p
Pub. in Army Administrator, v7 n4 p2-4 and 20-22 Jul-Aug 80.

No abstract available.

AD-A087 012/1 PC **A04**/MF **A01**
Naval Training Equipment Center Orlando FL
Field of View Requirements for Carrier Landing Training.
Final rept.,
Stanley C. Collyer, G. L. Ricard, Michael Anderson, Daniel P. Westra, and Ricky A. Perry. Jun 80, 64p NAVTRAEQUIPC-IH-319, AFHRL-TR-80-10

Simulator visual field-of-view (FOV) requirements were investigated in conjunction with two approaches to training daytime carrier circling approach and landing. Evidence does not support a requirement for a wide-angle visual display for the training of circling approaches and carrier landings. Three groups of Air Force T-38 instructor pilots were given simulator training in aircraft carrier landings. These pilots were taught to execute a landing on a simulated aircraft carrier in the Advanced Simulator for Pilot Training (ASPT) at Williams Air Force Base. The visual image for the simulation was provided by a data base which created the aircraft carrier USS Forrestal (CVA-59) in the ASPT computer-image-generation system. The pilots in these three groups were trained under different conditions. Two groups flew a circling approach with one group using a wide (300 degrees horizontal/150 degrees vertical) visual FOV and the other group using a narrow FOV (48 degrees horizontal/36 degrees vertical). A third group flew a straight-in approach using the narrow FOV. A variety of performance measures were taken to characterize the carrier approach. These measures were categorized as (a) instantaneous measures, (b) continuous measures, (c) measures representing the success of the approach at touchdown, and (d) Landing Signal Officer (LSO) ratings. Various statistical routines were carried out with the results obtained from these measures.

AD-A087 066/7 PC **A02**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
Reading Grade Levels of Air Force Civilian Personnel.
Interim rept. Sep 78-Dec 79,
Randy H. Massey, and John J. Mathews. Jul 80, 17p Rept no. AFHRL-TR-80-11

The objective of this study was to examine the reading levels of Air Force civilians according to occupational groupings and grade structure. Civilian grade structure was composed of classification types General Schedule (GS), Wage Supervisor (WS), and Wage Grade (WG) and grade levels (1, 2, 3, ...). Approximately 1,050 Air Force civilian subjects were tested on the Nelson-Denny Reading Test (ND) or the California Reading Test (CR). The ND was administered to GS-7 and above and WS subjects. The CR was administered to GS-1 through GS-6 and to Wage Grade (WG) subjects because of the expected lower reading level of these groups. Subjects were selected from eight Air Force bases representing the major commands. The GS, WG, and WS samples were selected to be proportionate to the composition of the Air Force civilian population. Reading grade levels were reported for Air Force civilians according to occupational groupings and grade structure. This study demonstrated that the RGL of subjects was associated with the grade of subjects; however, the meaning of this association is not clear. Difficulties associated with the application and interpretation of the RGL concept were discussed. It was concluded that other RGL questions or associated variables need to be investigated to determine where the utility of RGL knowledge lies-in selection, in classification, revision of certain materials, or in decisions about the extent of remedial training and to whom it should be administered. (Author)

AD-A087 067/5 PC **A03**/MF **A01**
Advanced Research Resources Organization Washington DC
Introduction of Women into Work Groups in Traditionally Male Career Fields: Annotated Bibliography.
Final rept.,
Merri-ann Cooper, David L. Imhoff, and David C. Myers. Jun 80, 30p AFHRL-TR-80-22
Contract F33615-79-C-0007

The purpose of this annotated bibliography is to identify prior research relevant to the individual, group, and organizational factors involved in the introduction of women into work groups in traditionally male career fields. This research revealed that most of the literature has been concerned with the problems that women experience rather than those methods which give insights to alleviating the problems of women in non-traditional careers. (Author)

AD-A087 068/3 PC **A02**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
Airborne Performance Measurement Assessment: Low Altitude Tactical Formation in Two Operating Environments.
Interim rept. Jun-Oct 78,
Joseph C. DeMaio, and Edward E. Eddowes. Jul 80, 17p Rept no. AFHRL-TR-79-44

A method was developed to assess pilot performance in low altitude tactical formation (LATF) and to relate overall performance to performance on subtasks necessary to mission success. The method was used to evaluate the performance of 28 pilots assigned to an operational A-7 squadron. The method was found to provide a consistent measure of pilot performance and to reveal the importance of certain pilot skills to the LATF task. Performance ratings were obtained under routine operating conditions and under conditions of simulated combat. Differences were obtained in performance ratings under the two conditions. Implications for currency training were discussed.

AD-A087 084/0 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Analysis of Factors Influencing the Turnover of United States Air Force Pilots in the Six to Eleven Year Group.
Master's thesis,
Clyde E. Gulick, and Henry E. Laakman, Jr. Jun 80, 114p Rept no. AFIT-LSSR-I-80

A current major problem facing Air Force managers is the retention of pilots in the six to eleven year group. This research uses a conceptual model of turnover as the structure for the study of the pilot exodus. The USAF Officer Exit Survey, designed and administered by AFMPC, was used as the data base to ascertain the most significant determinant to turnover--assignment policies. A recommended modification to the current assignment policies could improved pilot retention by a significant amount. This proposed recommendation would require no additional appropriations of funds or approval from agencies outside the Air Force chain of command. (Author)

AD-A087 085/7 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Strategic Airlift Pilot Scheduling Technique Utilizing Statistical Analysis.
Master's thesis,
Dean H. Haylett, and Craig W. Spiess. Jun 80, 154p Rept no. AFIT-LSSR-7-80

The Military Airlift Command (MAC) is faced with an ever-increasing pilot retention problem. In recognizing this problem, MAC submitted a Strategic Airlift Aircrew Survey (SAAS) to the MAC aircrew members in 1977. The results of the SAAS indicated that an unstable flying schedule was a primary cause of the high voluntary pilot separation rates. This thesis has examined the MAC flying schedule to determine if there are any relatively predictable elements to the schedule. The authors have taken the predictable elements and have devised techniques for employment at the squadron level to create additional stability in the pilot's flying schedule. The areas of predictability were determined through the use of normality and T-Tests. Regression analysis was then employed to aid the squadron's pilot scheduler in preparing a complete monthly flying schedule prior to the beginning of the affected month. If increased stability in the schedule is achieved, pilot retention rates should increase dramatically. (Author)

AD-A087 087/3 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Cost Impact Investigation of AFLC Unfunded Type I (Contractor) Training.
Master's thesis,
John N. Allen, and Carl J. Wiles, Jr. Jun 80, 155p Rept no. AFIT-LSSR-13-80

This research was initially designed to investigate the cost impact on AFLC imposed by the shortage of Air Training Command (ATC) Type 1 training funds in FY79. Specifically, the research objective was to compare costs incurred by AFLC as a result of implementing continued contractor support or Contractor Engineering Technical Services for programs which could not be supported by ATC funded Type 1 training. It was intended that cost data be compiled from ATC and AFLC to (1) determine if there exists a statistical relationship between the estimated cost of unfunded Type 1 training and the cost of the above alternatives when used as a result of no training; and (2) compare training costs with alternative costs to determine the cost effectiveness to the Air Force of implementing alternatives compared to funding Type 1 training. The study encountered significant problems, however, in attempting to retrieve alternative cost data from the AFLC Air Logistics Centers. The study was then diverted to investigating these problems and relating the research objective to the FY80 funding situation. An explanation of the proposed statistical methodology and application to hypothetical data is provided in the Appendix to support future research in this area. (Author)

AD-A087 089/9 PC **A09**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Model of Aircraft Maintenance Officer Turnover.
Master's thesis,
Joanne M. Flanigan, and Laurence J. R. Little. Jun 80, 184p Rept no. AFIT-LSSR-20-80

Turnover is a major problem in the Air Force. Turnover costs the Air Force millions of dollars annually. A less tangible cost is the degraded readiness that results from the loss of trained personnel. These trained personnel are essential because of the growing technological complexity of our weapon systems. To maintain these systems we need an experienced and dedicated aircraft maintenance officer force. These aircraft maintenance officers are leaving career field and the Air Force. To reduce the number of officers who are leaving, we must first determine what factors are causing turnover and the relationship among these factors and turnover. The more the manager knows about the factors causing turnover, the better he can influence turnover. To determine these factors a survey was sent out by Captains Mills and Osadchey to 834 aircraft maintenance officers. This study used the data obtained from the 578 responses to develop a model of turnover. The authors concluded that job satisfaction was the most important contributor to cross training turnover and Air Force turnover. (Author)

AD-A087 090/7 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics

A Correlation between the Assignment of Personnel to Technical Order Validation/Verification Versus Technical Order Deficiency Forms Generated.
Master's thesis,
Herman Williams, and Arthur B. Winn. Jun 80, 82p Rept no. AFIT-LSSR-22-80

During the acquisition phase of weapon system procurement, the technical manuals are developed along with the design of the weapon system. The process of proofing the manual is called validation/verification. This research investigated the relationship hypothesized to exist between the number of people attending validation/verification and the number of AFTO Form 22 discrepancy forms generated when the weapon system was delivered to the using commands. Although the variables were tested to models of linear, exponential and hyperbolic equations, no significant correlation was found to exist. (Author)

AD-A087 092/3 PC **A11/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Analysis of Minuteman Missile Crew Member Attitudes Toward Present Minuteman Education Program and Possible Alternatives.
Master's thesis,
Donald L. Kemp, and Andrew T. Rybacki. Jun 80, 232p Rept no. AFIT-LSSR-25-80

Since the introduction of the Minuteman Missile into the arsenal numerous authors have identified problem areas that have hindered the operational effectiveness and morale. Crew member attitudes and the Minuteman Education Program (MMEP) have been the basis for many of these studies, the latest survey was conducted in 1978. The purpose of this study was to determine: (1) the current attitudes of the Minuteman Combat Crew Members (MCCMs); (2) compare the current attitudes with the results of previous studies to determine if a significant difference occurred during the last four years; and (3) determine if they would be willing to accept modifications in the current MMEP in the form of alternate curriculum, course presentations, or graduate degree programs. The authors concluded that: (1) the MCCMs' attitudes have not improved towards their job, their career field, or the MMEP since 1976; (2) the MCCMs would be willing to accept modifications in the MMEP in the form of alternate curriculum and alternate graduate degree programs; but (3) they are not willing to modify the presentation methods, for one of those suggested, or change the present curriculum, for one that better meets the needs of the Air Force. (Author)

AD-A087 099/8 PC **A04/MF A01**
Frank J Seiler Research Lab United States Air Force Academy CO
The USAF Academy How-To-Study Program: A Handbook for Volunteer Counselors. 2nd Edition.
Interim rept. May-Jul 80,
Mark Nataupsky, Nita Huelf, and John Bermudez. Jul 80, 57p Rept no. FJSRL-TR-80-0016

General counseling tips are provided as background information for How-To-Study counselors. Information is presented to identify students with possible learning disabilities. There are a series of eleven session plans to guide student counseling. Key emphasis is placed on awareness of time spent studying and time management. Other sessions focus on more specific information such as note-taking skills and test-taking strategies. Guidance is provided to determine when a student is self-sufficient and no longer needs to be in the program. (Author)

AD-A087 103/8 PC **A03/MF A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
An Assessment of Hispanic Recruits Who Speak English as a Second Language.
Final rept. Oct 79-May 80,
Eduardo Salas, J. Peter Kincaid, and Nancy Ashcroft. Jun 80, 40p Rept no. TAEG-86

This study was conducted to determine the extent of the Navy's problem with recruits who speak English as a Second Language (ESL). One hundred and two Hispanic recruits were tested and interviewed at RTC Orlando to assess their proficiency in English and problems that low proficiency might be causing in recruit training. Two groups who work with Spanish-speaking recruits responded to a questionnaire. Results indicated (1) the Navy needs an ESL training program, (2) the Defense Language Institute's English Comprehension Level test should be used to screen recruits for ESL training, and (3) all recruits who speak English as a second language and who have had no prior U.S. education should be referred automatically to the ESL program. An economic analysis was also conducted. The analysis indicated that the costs which would be saved by lowered attrition would pay for the ESL program. (Author)

AD-A087 120/2 PC **A99/MF A01**
Navy Personnel Research and Development Center San Diego CA
Proceedings of the Annual Conference of the Military Testing Association (21st), San Diego, California, 15-19 October 1979.
1979, 1009p

The papers presented at the Twenty First Annual Conference of the Military Testing Association came from the business, educational, and military communities, both foreign and domestic. The papers reflect the opinions of their authors only.

AD-A087 188/9 PC **A05/MF A01**
Human Resources Research Organization Alexandria VA
Recommendations Concerning Methods and Media Appropriate to Leadership Training and Education at the US Coast Guard Academy.
Interim rept.,
T. O. Jacobs. May 73, 82p Rept no. HUMRRO-IR-D4-73-6
Contract DOT-CG-22532-A

This report presents an analysis of leadership training needs of junior officer Academy graduates, and suggestions for methods and media for improving their on-the-job leadership skills. (Author)

AD-A087 190/5 MF **A01**
Logicon Inc San Diego CA Tactical and Training Systems Div
Ground Controlled Approach Controller Training System (GCA-CTS) System Documentation.
Final rept. 23 Sep 77-23 Feb 80,
Gene Barber, John Bollenbacher, Dan Brewton, David Harry, and Mary Hicklin. Jun 80, 732p
NAVTRAEQUIPC-77-C-0162-3
Contract N61339-77-C-0162
See also report dated Apr 79, AD-A069 036.
Availability: Microfiche copies only.

This report describes the hardware and software which satisfy the functional requirements for an automated training system for the training of Ground Controlled Approach (GCA) controllers. Hardware descriptions include the system controller, the trainee station and the instructor station. Software descriptions include modes of operation, speech understanding, speech generation, performance measurement, and the simulation of pilot, environment radar and displays. (Author)

AD-A087 222/6 PC **A06/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Defense Contractor Employee Overseas Compensation and the Foreign Earned Income Act of 1978.
Master's thesis,
James D. Mayer, and David F. Whealdon. Jun 80, 122p Rept no. AFIT-LSSR-10-80

The objective of this research was to develop a definitive DOD pricing instruction for tax allowance compensation. The instruction applies to service contracts for personnel involved in AF and FMS contracts overseas. The information provided to the individual taxpayer by the IRS was consolidated into a format usable by the AF contract negotiator to set the AF objective for tax allowance. Tax allowance compensation is necessary because of the adverse impact of the Foreign Earned Income Act of 1978 on contract employees going overseas. Basic models were developed to aid the calculation of the tax allowance for a representative contractor employee. (Author)

AD-A087 233/3 PC **A08/MF A01**
Gibboney (Richard A) Associates Inc Silver Spring MD
Life Path as a Predictor of Performance in the Navy: A Longitudinal Study.
Final rept.,
Johnnie Daniel. Apr 80, 160p
Contract N00014-77-C-0678

this study involved the follow-up of 1500 recruits at the Navy Recruit Training Centers during the early part of 1977, and the collection and analysis of new data on the 750 first-term enlistees stationed at three Naval air stations during the spring of 1978. The purposes of this study were to further refine the LPQ and instruments which had been previously developed to measure military performance; and to determine the extent to which LPQ was related to attrition and performance among the 1977 recruit sample, and performance among the 1978 air station respondents. As a result of the study it was found that we could reduce the number of items in constructing the LPQ scales while at the same time increase explanatory power of the scales. The LPQ scales were shown to have significant relationships with both attrition and job performance. However, not all the items which had a significant effect on attrition had a significant effect on job performance, and in turn, not all items which had a significant effect on job performance had a significant effect on attrition. Some items had a significant effect on both attrition and performance. Attrition and job performance appeared to be distinct phenomena. The reasons why an individual left the Navy were not necessarily the same reasons for poor job performance. Different LPQ scales were constructed for predicting attrition and job performance.

AD-A087 306/7 PC **A02/MF A01**
AAI Corp Cockeysville MD
Minutes, Publications. Guidance Conference - F-16 Electronic Warfare Training Device.
Jun 80, 12p Rept no. AAI-ER-10499
Contract F33657-79-C-0820

No abstract available.

AD-A087 419/8 MF **A01**
Air War Coll Maxwell AFB AL
Air Force Heroes in Vietnam.
USAF Southeast Asia Monograph Series Volume VII, Monograph 9,
Donald K. Schneider. 1979, 100p
Availability: Superintendent of Documents, GPO, Washington, DC 20402, Stock Number 008-070-004-48-8, HC $4.00. Microfiche furnished to DTIC (and NTIS) users.

This ninth essay of the Southeast Asia Monograph Series tells the stories of the 12 Air Force heroes who were awarded the Congressional Medal of Honor for action in Vietnam. The author, Major Schneider, has chosen a most unusual and effective way of presenting his material, for he is greatly concerned with the contextual aspects of what he describes; this is, he devotes considerable attention to the history of the Medal itself, particularly insofar as airmen of earlier wars are concerned, to the aircraft in which these latest recipients flew, and to the missions with which both the men and their machines were entrusted. These factors, then are put in the context of the battle arena-Vietnam, with all of its special conditions and limitations. There 12 airmen of the United States Air Force acted with such courage, devotion, and utter selflessness that they were subsequently awarded the highest recognition that their country could bestow, the Medal of Honor. Three of the men died in the actions for which they were cited. But in one sense at least they and the others will never die, for their actions have insured that their names will live as long as determination, fidelity, bravery, and nobility of spirit are traits that human beings admire.

AD-A087 430/5 PC **A03/MF A01**
RAND Corp Santa Monica CA
Estimating Military Personnel Retention Rates: Theory and Statistical Method.
Interim rept.,
Glenn A. Gotz, and John J. McCall. Jun 80, 46p Rept no. RAND/R-2541-AF
Contract F49620-77-C-0023

A Dynamic Econometric Retention Model (DERM) is designed for studying the effects of alternative compensation policies on the retention behavior of Air Force officers, including the Uniformed Services Retirement Modernization Act, the President's Commission on Military Compensation, and the Uniformed Services Retirement Benefits Act. DERM is a model of sequential behavior containing the appropriate econometric method for estimating the retention rate. The econometric method is a maximum likelihood procedure endogenously determined by the specification of the behavioral model. It differs from earlier approaches in that it explicitly considers the behavioral effects flowing from decomposing the disturbance term into permanent and transitory components. An important implication of DERM is that retention rates depend both on prospective future returns to remaining in the military on past occurrences. If this is correct, then simple regression models should overpredict the retention gains of proposed compensation policies, exactly what happens in two recent reenlistment studies that use regression analysis. (Author)

AD-A087 431/3 MF **A01**
Duke Univ Durham NC Center for Applied Business Research
The Impacts of Various Types of Advertising Media, Demographics, and Recruiters on Quality Enlistments: Results from Simultaneous and Heteroscedastic Models.
Interim rept.,
Richard C. Morey. Jul 80, 101p Rept no. TR-N-1
Contract N00014-80-C-0200
Availability: Microfiche copies only.

This research is geared towards determining the most cost-effective mix of various types of advertising and recruiters to meet the quality enlistment goals for the enlisted Navy. The impacts of five different types of advertising, recruiters, numerous demographic variables, relative pay, and the size of the delayed entry program are estimated and compared using a variety of regression approaches. The data base used is a pooled time series-cross sectional one providing over 1500 observations over the 3 year period 1976-78.

AD-A087 444/6 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Attitudes and Opinions of USAF Jet Engine Personnel Concerning Enlisted Career Progression.
Master's thesis,
Gary W. Pierce, and Erika A. Robeson. Jun 80, 116p Rept no. AFIT-LSSR-2-80

As the Air Force environment, including weapon systems, becomes more technologically complex, competent technicians have become increasingly important for maintaining force readiness. In spite of this importance, the USAF continues to lose technicians for many reasons. Under the present policy it is essentially impossible for a technician to remain a technician. Under normal career progression, the technician is promoted and moves into supervisory roles. The objective of this research was to determine the attitudes and opinions of enlisted technicians toward the current USAF promotion system. The target population for the survey was USAF specialty 426X2, jet engine technicians. This study was exploratory in nature. It did not attempt to investigate the causes or effects of attitudes, but did attempt to determine the predominant attitudes and their degree of consensus. Subject areas surveyed were importance and status of technicians and supervisors in the USAF, skill and experience levels, current promotion system, the transition from technician to supervisor, and the concept of career technician. (Author)

AD-A950 000/0 MF **A01**
Naval Training Device Center Port Washington NY
General Specification for Testing of Operational Flight and/or Tactics Trainers Simulation.
3 Oct 52, 31p Rept no. SPECDEVCEN-911-600A Supersedes Rept. no. SPECDEVCEN-911-600 dated 15 Aug 52.
Availability: Microfiche copies only.

No abstract available.

AED-Conf-77-498-007 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
General Aspects of a Manpower Development Programme.
F. Calori, and E. I. Goodman. 1977, 16p CONF-7709147-65
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

A manpower development program as a long term program for developing countries, requirements based on objectives, organizations and roles, a utility program, the level of domestic involvement, the methodology of a manpower development program and the identification of requirements are treated. (Atomindex citation 09:384103)

ED-176 802 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
Computer Based Learning in the Soviet Union--II. A Report on a Study Visit to Moscow, November-December 1978,
N. J. Rushby. Apr 79, 35p
For related documents, see IR-007 784 and IR-007 827. Text in English, Dutch, German, Italian and French.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report examines the state of computer based learning (CBL) in the Soviet Union based upon information gained during a visit to the Moscow Institute of Steel and Alloys, Moscow State University, and the Institute for Problems of Higher Schools. The visit had two aims: to study the political, educational, and technological pressures on CBL in the USSR, and to establish a channel for the continuing exchange of information about CBL between the UK and the Soviet Union. specific topics examined include teaching programming; the role of statistics and economics in CBL; software philosphy; user support; information systems management; teaching foreign languages, chemistry, and physics; Institute role in innovation; CBL system development; automated dialog and corrective teaching; and information exchange. Nine summary conclusions and recommendations based on the visit are included.

ED-176 804 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
Computer Based Learning in Europe: A Bibliography,
N. J. Rushby. Jan 78, 18p
Text in English, Dutch, German, Italian and French. For a related document, see IR-007 784.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography lists 172 references to papers on computer assisted learning (CAL) in European countries including the Soviet Union, Germany, Holland, Sweden, Yugoslavia, Austria, and Italy. The references which deal with such topics as teacher training, simulation, rural education, model construction, program evaluation, computer managed instruction, instructional sequencing, and computer graphics, have been extracted from the computer based general CAL bibliography maintained by the CEDAR Project.

ED-176 805 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
Computer Based Learning in the Soviet Union--I,
N. J. Rushby. Oct 78, 16p
For related documents, see IR-007 784 and IR-007 789. Text in English, Dutch, German, Italian and French.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography lists 86 references, most of which are annotated, to papers and journal articles on computer assisted learning (CAL) in the Soviet Union. Topics dealt with include problem solving models, decision strategies, programmed instruction, algorithms, simulation, educational games, databases, and testing, The references have been extracted from the computer based CAL bibliography maintained by the CEDAR Project.

ED-176 806 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
Computers in Chemistry Teaching: A Bibliography and Index of CAL Packages,
N. J. Rushby. Jul 79, 33p
For a related document, see IR-007 784. Text in English, Dutch, German, Italian and French.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This resource document lists 36 books, papers, and reports dealing with various uses of computers in chemistry instruction; and describes several computer program packages available for use in teaching undergraduate, experimental laboratory, physical, and nuclear and X-ray chemistry, including biochemistry. Each program package is presented by reference number, name, description, subject, comment, language, and contact source for obtaining the package.

HRP-0902003/3 PC **A18**/MF **A01**
Educational Testing Service, Princeton, NJ.
A Course for Health Systems Agency Boards. Leader's Guide.
1979, 415p
Contract PHS-HRA-230-75-0064

This course is intended to help health systems agency (HSA) board members become informed decisionmakers. Four specific course goals are to help board members: understand the nature, function, and process of the HSA and their own responsibilities; acquire and utilize skills needed to function effectively; understand basic concepts in good board practices; and develop a self-directed program for continued growth. Instructional activities are practice-based. Materials are presented in a series of multimedia modules that emphasize the National Health Planning and Resources Development Act of 1974, roles and responsibilities of HSA governing bodies, context and environment in which HSA's operate, major functions of HSA's and special roles and responsibilities of board members, and agency governance and management. Information given for each program includes a one-page summary, goals and objectives, teaching methods, needed materials and equipment, faculty requirements and suggestions for teaching, resource materials, evaluation strategy, time allocation, and evaluation information from a pilot program presentation.

PB80-205511 PC **A05**/MF **A01**
Maine Univ. at Orono. Coll. of Education.
A Handbook For the Development of Local Career Education Plans,
Charles W. Ryan, Robert J. Drummond, and John M. Sutton, Jr. Aug 78, 89p

The purpose of this handbook is to provide school administrators, curriculum supervisors, faculty and school counselors guidelines for implementing career education. Theoretical constructs, resources and strategies are presented to assist in preparing for implementation of career education at the local level. Careful scrutiny of this material will enable one to answer basic questions about the purpose of career education to parents and other interested citizens. The development of the material in this handbook will be of use to school systems with limited resources. All strategies and activities were designed to be used with limited reliance on commercial materials.

PB80-205974 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Trainability Testing: The Miniature Training and Evaluation Approach to Testing.
Personnel research rept.,
Patricia Harris-Thomas. May 80, 18p PRR-80-9

The report reviews the personnel literature on the miniature training and evaluation approach to em-

ployment selection. The approach is characterized by the inclusion of a structured and controlled period of learning in the test situation and is used to select personnel for training on the basis of their ability to learn relevant job tasks rather that their ability to demonstrate competence in performing such tasks. A discussion of the theoretical basis for miniature training and evaluation testing is presented as well as empirical evidence of its reliability and validity in predicting trainability. The report also presents a discussion of procedures essential to the design, construction, and statistical validation of miniature training and evaluation tests, the advantages and disadvantages of such tests, and the feasibility of extending their application beyond the traditional use for jobs requiring manual skills to those at the professional, administrative and technical entry levels.

PB80-205982 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Task Analysis in the Design of Three Concurrent Validity Studies of the Professional and Administrative Career Examination.
Personnel research rept.,
Marvin H. Trattner. Apr 80, 14p PRR-80-2

The U.S. Civil Service Commission conducted three criterion-related validity studies for its PACE test. The criterion instruments for each study included a specially designed supervisory rating form, a job information test, and a work sample. For each criterion, scores were obtained separately for the occupational duties. Data provided by a computer analyzed-task inventory served to (a) determine the extent of homogeneity of the occupation; (b) select subjects for inclusion in the research study if the occupation was heterogeneous; (c) measure the importance of the tasks in order to construct valid criterion instruments; and (d) weight duty performance scores obtained by the research participants according to time spent; so as to arrive at an overall measure of job success for each criterion instrument. Summary duty descriptions consisting of the most time-consuming tasks constituted the supervisory rating and ranking scales. Job information test items were used if they measured the most time-consuming duties. The linkage between specific duties and work sample items was made after the fact, since the work sample measured integral units of work performance. Only one time-consuming duty could not be measured by the criterion tests for one of the three occupations. It was concluded that the research design fostered the demonstration of the high validity of the PACE test.

PB80-206550 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Women in Public Service: Recommendations for the Future.
May 80, 10p HUD/PDR-576, HUD-0001510

The Center for the American Woman and Politics (CAWP), Eagleton Institute at Rutgers University, undertook a HUD-funded study of women in public service. Out of this evolved the publication of three volumes. The third, Changing the Opportunity Structure for Women in the Public Sector, is the focus of this report. CAWP prepared a series of options that, if implemented, would increase the number of women in government and help them become more effective public servants. The options highlighted here represent a core of activities that foundations, educational and research institutions, professional associations, public interest groups, and government agencies can undertake to bring more women into city management and to make their tenure fulfilling both for them and the public they serve. The options are of five kinds: to correct stereotypes, to improve recruiting, to develop skills and identify resources, to build support systems, and to update and extend research. Each option is described in terms of background and recommendations. Footnotes and references are included.

PB80-206659 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Guide to Conducting Workshops for Housing Management Personnel. Instructor's Guide.
Feb 79, 50p HUD/PDR-537-20, HUD-0001346
Grant HUD-H-2225G

The teaching guide provides new and experienced workshop leaders with background information needed to conduct workshops for housing management personnel. The first section discusses learning supports including preparation, climate setting, promoting group acceptance, encouraging a sense of autonomy among learners, clarifying goals and expectations, sensitivity, and organization of physical facilities. The second section covers theoretical supports for participatory learning and criteria for selecting various instructional methods and aids. Descriptions of several instructional methods are given. Next, dynamics of group learning, characteristics of adult learners, and connection of workshop content to work experience are reviewed. The final section explains techniques for choosing evaluation types, developing an evaluation instrument, administering evaluations, and analyzing evaluation results. A diagram of the Learning Objective/Anticipated Outcome workshop model, used for the 18 workshops for housing management personnel, is presented in generic form. A bibliography and list of workshop titles are included.

PB80-206717 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Communication Skills for Housing Managers. Instructor's Guide.
Feb 79, 86p HUD/PDR-537-5, HUD-0001313
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206725.

The instructor's guide on communication skills for housing managers is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. It reprints all the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206725 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Communication Skills for Housing Managers. Participant's Workbook.
Feb 79, 43p HUD-PDR-537-7, HUD-0001314
Contract HUD-H-2225G
See also Instructor's Guide, PB80-206717.

To enable housing managers to communicate more effectively with residents, employees, and supervisors, this workbook, 1 of 18 developed by HUD to upgrade management skills in HUD-related housing, discusses the qualities of a good listener, elements of a communications model, principles of good communication, and the responsibilities of managers with respect to feedback. A rumor-clinic observation form, a posttest, and a skill test are included.

PB80-206907 PC **A09**/MF **A01**
Akman Associates, Inc., Silver Spring, MD.
Design for Housing and Urban Development (HUD's) Residential Construction Wage Survey. Volume 1: Survey Design Alternatives.
Final rept.
31 Mar 80, 180p HUD-0001502
Contract HUD-HC-5118
See also Volume 2, PB80-206915.
Also available in set of 4 reports PC E11, PB80-206899.

The report is the first volume of a four-volume report whose major purpose is to develop alternative survey designs to acquire residential construction wage data for use in determining prevailing wage rates under the Davis-Bacon Act. This first volume of the final report includes discussion of the scope of existing HUD residential survey activities, and an assessment of the current HUD residential survey effort. The need for residential surveys, for formulating alternative approaches to conducting residential surveys, and for estimating costs and impact of alternative survey designs on HUD housing programs is considered. Finally, recommendations for future HUD actions are offered. Tables and footnotes are provided. Appendices contain data on estimates, methodology, and methodological alternatives.

PB80-206915 PC **A03**/MF **A01**
Akman Associates, Inc., Silver Spring, MD.
Design for Housing and Urban Development (HUD's) Residential Construction Wage Survey. Volume 2: Department of Labor (DOL) Acceptance Criteria.
Final rept.
31 Mar 80, 29p HUD-0001503
Contract HUD-HC-5118
See also Volume 1, PB80-206907 and Volume 3, PB80-206923.
Also available in set of 4 reports PC E11, PB80-206899.

The second volume of a four-volume report presents a draft memorandum of understanding which identifies the roles and responsibilities of the Department of Labor (DOL) and HUD in the residential wage determination process under the Davis-Bacon and related acts. The major purpose of the entire report was to develop alternative survey designs for acquiring residential construction wage data. This volume describes the underlying principles for an interagency agreement, details for HUD and DOL respective roles in the residential wage survey process, and provides a rationale for the proposed agreement.

PB80-206923 PC **A04**/MF **A01**
Akman Associates, Inc., Silver Spring, MD.
Design for Housing and Urban Development (HUD's) Residential Construction Wage Survey. Volume 3: Recommended Evaluation Plan.
Final rept.
31 Mar 80, 63p HUD-0001504
Contract HUD-HC-5118
See also Volume 2, PB80-206915 and Volume 4, PB80-206931.
Also available in set of 4 reports PC E11, PB80-206899.

This third volume of a four-volume report describes the evaluation plan recommended as part of the expanded HUD wage data collection process. The major purpose of the entire report was to develop alternative survey designs for acquiring residential construction wage data for use in determining prevailing wage rates under the Davis-Bacon Act. The roles and responsibilities of various HUD organizations are described in this volume, in terms of the evaluation process, and prodedures for evaluating the four main issues are detailed. The issues are to determine (1) the priorities that exist for conducting residential wage surveys, (2) the cost of conducting wage surveys, (3) the quality of HUD wage surveys, and (4) the impact of survey efforts on HUD housing activity. Next, the personnel and data processing resources required for conducting the evaluation are described. Discussion concludes with a consideration of the major tasks which must be undertaken by HUD to initiate the evaluation effort in conjunction with the expanded survey effort. Figures are provided.

PB80-206931 PC **A04**/MF **A01**
Akman Associates, Inc., Silver Spring, MD.
Design for Housing and Urban Development (HUD's) Residential Construction Wage Survey. Volume 4: Handbook for Conducting Davis-Bacon Wage Surveys.
Final rept.
31 Mar 80, 69p HUD-0001505
Contract HUD-HC-5118
See also Volume 3, PB80-206923.
Also available in set of 4 reports PC E11, PB80-206899.

The fourth volume of a four-volume report presents a handbook for HUD personnel involved in conducting surveys to acquire residential construction wage data for use in determining prevailing wage rates under the Davis-Bacon Act. It is recommended that HUD adopt a survey design based on ensuring that, at a minimum, countries with high and medium concentrations of construction activities are surveyed on a 3-year cycle. The following features should be included in the survey design: (1) a headquarters management staff responsible for overall coordination, policy formulation, and evaluation; (2) clearly established responsibility, priorities, and incentives for field staff to guarantee sufficient time is devoted to conducting wage surveys; and (3) built-in evaluation procedures to ensure that adequate program data to facilitate

performance reviews and annual budgetmaking are acquired as part of day-to-day operations. The procedures outlined here present the necessary steps to provide a survey and recommended schedule of prevailing wages at least equivalent to the minimum standards set forth in policies by the U.S. Department of Labor (DOL).

PB80-207053 PC **A06**/MF **A01**
California State Dept. of the Youth Authority, Sacramento.
Job Survival Skills of Youthful Offenders: A Needs Assessment and Curriculum Development Project.
Final rept.,
Mark R. Wiederanders, Albert Victor Luckey, and Candace J. Cross-Drew. Oct 78, 114p
Grant OEG-007604319

The needs of Youth Authority parolees were determined by interviewing a representative sample of 145 parolees. Findings were used to develop a high-activity, low-reading level course covering approximately 44 class hours. Over 300 firms were contacted to locate resource materials for the course. Five modules make up the course: (1) Motivation and orientation to job survival skills; (2) matching skills and interests to jobs; (3) job-seeking skills; (4) job-getting skills; and (5) job-maintenance skills. About half of the class hours are alloted to the fifth (job maintenance) module; the remainder of time is distributed equally among the first four modules.

PB80-207186 PC **A04**/MF **A01**
Executive Techology, Albuquerque, NM.
A Short Guide to the Development of Work Sample and Performance Tests. Second Edition.
Professional paper,
Lynette B. Plumlee. Feb 80, 62p OPM/PP-80-3
See also report dated Aug 78, PB-290 339.

The guide is designed to provide physchologists and other measurement specialists in the Office of Personnel Management, in various Federal agencies, and in State and local governments with a brief source document which summarizes the procedures for developing work sample and other performance tests. This second edition continues to bring together techniques and procedures used by those who have been extensively involved in performance test development. It also incorporates the legal requirements of the Uniform Guidelines on Employee Selection Procedures. References are made to texts and other sources which will provide background material.

PB80-207244 PC **A05**/MF **A01**
Nevada Legislative Counsel Bureau, Carson City. Legislative Commission.
Administrative Procedures Followed by the Nevada Industrial Commission and Alternative Methods of Providing Workmen's Compensation Coverage.
Oct 78, 79p BULL-79-1

The Legislative Commission's Subcommittee to study the Administrative Procedures followed by the Nevada Industrial Commission and Alternative Methods of Coverage was formed as a result of the diverse proposals before the 59th session of the Nevada legislature to permit private insurance carriers to write workmen's compensation insurance in this state and modify certain practices and procedures of the commission. The report discusses the benefits and problems of a three-way system of coverage.

PB80-207996 PC **A04**/MF **A01**
Department of Labor, Washington, DC. Library.
Apprenticeship: Selected References, 1974-1979.
Bibliography rept.
1979, 60p USDL-LIB-80-03
See also report dated Jul 74, PB-300 303.

A supplement to an earlier bibliography, Apprenticeship in the United States, issued in 1974 (PB-300 303), which covered roughly the preceding 10-year period. The new bibliography lists books, pamphlets and articles on the general subject of apprenticeship, and contains in addition, sections on special topics such as Standards for Apprenticeship, Descriptons of Individual Apprentice Programs, Minority and Disadvantaged Groups in Apprenticeship, Women in Apprenticeship, Apprenticeship in Other Countries. One section lists publications about apprenticeship programs of the State governments (in the United States).

PB80-208002 PC **A03**/MF **A01**
Department of Labor, Washington, DC. Library.
The Davis-Bacon Act: Selected References.
Bibliography rept. 1931-79.
1979, 33p USDL-LIB-80-02

A bibliography on the Davis-Bacon Act, which regulates wages paid to employees by contractors awarded government building contracts. The bibliography gives complete citations to books and pamphlets, magazine articles, conference papers, legislative histories, Congressional and other government documents, recent newspaper articles from the New York Times and other papers. Annotations are included for most of the titles listed, as well as for the newspaper articles.

PB80-208085 PC **A03**/MF **A01**
National Opinion Research Center, Chicago, IL.
Conditional Likelihood Models for Heterogeneity in Longitudinal (Panel) Data,
Nicholas M. Kiefer. May 80, 43p
Grant DL-21-17-78-50

The report develops econometric models for heterogeneity in panel data. The conditional likelihood approach, which requires few and unrestrictive assumptions about the distribution of unobservables in the population, is used. The techniques are applied to estimate an intertemporal substitution (of time) elasticity based on the NLS data. The elasticity was found to be somewhat sensitive to the estimation technique. Conditional likelihood estimates are about .05 for white males and .1 for nonwhite males. These can be interpreted as effects of a temporary wage subsidy program, preceived by workers as not strongly affecting lifetime income.

PB80-208366 PC **A04**/MF **A01**
Bureau of Labor Statistics, Washington, DC. Office of Wages and Industrial Relations.
Compensation in the Construction Industries in Large Metropolitan Areas.
Final rept. 1976-77,
Martin Personick. Jun 80, 63p BLS/OWIR/CON-80, BLS-610

The report presents information from the Bureau of Labor Statistics survey of occupational wages and benefits of the construction industries, conducted in 17 metropolitan areas in 1976-77. It includes a first-time analysis of the data by union status and type of construction for a composite of all large metropolitan areas that was extrapolated from the 17 areas actually studied.

PB80-208879 PC **A04**/MF **A01**
Illinois Univ. at Chicago Circle. Survey Research Lab.
Feasibility Study for a Survey of the Employers of Undocumented Aliens.
Project rept. (Final),
Barry R. Chiswick, and Francis A. Fullam. Jun 80, 62p DELTA-21-17-79-08-1
Grant DL-21-17-79-08

A non-probability sample of Chicago employers was selected from the Records of Deportable Alien (I-213) to determine whether employers would participate in a survey on potentially sensitive hiring practices, e.g., undocumented aliens. The sample was stratified by the alien's ethnicity (Mexican, non-Mexican) and industry (manufacturing, restaurant, otherservice). The interviews were face-to-face, preceded by a telephone appointment. The survey instrument was indirect, with specific questions regarding hiring youths, older workers, women, and migrants, including undocumented aliens. There were 31 completed interviews, 2 ineligible firms, and 9 refusals/unavailable, for a 78 percent completion rate among eligible employers. Employer's procedures generally indicated they check applicant's legal status which they incorrectly perceived to be a legal obligation. Questions on practices suggested they knew they were hiring undocumented aliens.

5J. Psychology (Individual and Group Behavior)

AD-A086 946/1 PC **A06**/MF **A01**
California Univ San Diego La Jolla Center for Human Information Processing
An Interactive Activation Model of the Effect of Context in Perception. Part I.
Technical rept. Apr 79-Mar 80,
James L. McClelland, and David E. Rumelhart. 15 May 80, 103p Rept no. 8002
Contract N00014-79-C-0323, Grant NSF-BNS76-14830
Sponsored in part by Grant NSF-BNS-76-15024.

This report is the first part of a two-part series introducing an interactive activation model of context effects in perception. In this part, is developed the model for the perception of letters in words and other contexts and a number of experiments in the recent literature is applied. The model is used to account for the perceptual advantage for letters in words compared to single letters and letters in unrelated strings. In the model, these word-superiority effects are produced by feedback. The visual input produces partial activations of letters, which in turn produce partial activations of words. These activations then produce feedback to the letter level, reinforcing letter sequences which spell words. The model can account for the basic findings on the perception of pronounceable nonwords as well as words. The account is based on the idea that pseudowords can also activate representations of words, even though they do not match any word perfectly. As with word displays, feedback from the activated words reinforces the letters presented, thereby increasing their perceptibility. The model also accounts for the role of masking in determining the magnitude of the various effects, the fact that expectations influence perception of letters in words, and for the fact that effects of contextual constraint and letter cluster frequency are obtained under some conditions and not others.

AD-A087 101/2 PC **A06**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Evaluation of a Loudness Discrimination Test.
Doctoral thesis,
Jeane Violon Singer. 13 May 80, 123p Rept no. ARL/PSU/TM-80-107
Contract N00024-79-C-6043
Doctoral thesis.

Recent research has demonstrated that temporary changes in loudness perception occur following high level noise exposure. Two pilot studies and an experiment are presented in this study which evaluates a noise-induced loudness perception test. The first two experiments investigated the feasibility of several loudness perception test parameters. The third experiment described a loudness Discrimination Growth Test (LDGT) which is based on the information obtained in the first two experiments. This LDGT was evaluated in terms of clinical feasibility, reliability, and sensitivity. The findings suggested that the LDGT is reliable, is affected by the spectral content of the exposure sound, and measures noise-induced temporary auditory change that is different from a temporary threshold shift growth test. With further research, this LDGT could be incorporated into a test battery for use in identifying those individuals who are sensitive to noise-induced auditory changes possibly before they develop permanent auditory impairment. (Author)

AD-A087 127/7 PC **A05**/MF **A01**
Tennessee Univ Knoxville Dept of Psychology
Research on the Multiple-Choice Test Item in Japan: Toward the Validation of Mathematical Models.
Scientific monograph,
Fumiko Samejima. Apr 80, 97p ONRT-M3
Contract N00014-77-C-0360

This monograph reports research, related to the multiple-choice test item, which is conducted by psychometricians and educational technologists in Japan. Sato's number of hypothetical equivalent alternatives is introduced. The author proposes a new index, k*, which can be used, among other things, for invalidating three-parameter models for

the multiple-choice item. Shiba's research on the measurement of vocabulary, which is based upon latent trait theory, includes an eventual tailored test on vocabulary, utilizing information obtained from distractors as well as correct answers. With this research in mind, the author has developed basic ideas about a new family of models for the multiple-choice item. These are based upon both the information given by distractors, and the correct answer and the noise resulting from random guessing. (Author)

AD-A087 131/9 PC **A05**/MF **A01**
Dunlap and Associates Inc La Jolla CA Western Div
Measures of Navy Pilot Workload, Sleep and Performance in Stressful Environments.
Final rept.,
Clyde A. Brictson, and Peter A. Young. Jan 80, 94p
Contract N00014-77-C-0066

Measures of Navy pilot workload, sleep and landing performance collected under two stressful environments--carrier deployment and carrier landing qualification are analyzed and described. The study was conducted to demonstrate the application and utility of data collection techniques in operational environments and to describe the typical workload and sleep activity of Navy pilots. Attack pilots and LSOs averaged 12-hour workdays at sea and supplemented their sleep by short naps during flying periods. Landing performance for attack aviators was remarkably high with boarding rates at night averaging 93 percent for the entire deployment. Performance decrement was noted both day and night only after extensive in-port periods of flight inactivity. Recommendations and summary data are discussed. (Author)

AD-A087 152/5 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
Center History and Future Course for the Center for Prisoner of War Studies, San Diego, California.
Final rept.,
Richard H. Rahe. 1979, 9p Rept no. NAVHLTHRSCHC-78-33
Pub. in the Proceedings of the Annual Joint Medical Meeting Concerning POW/MIA Matters (5th), p4-8 Dec 79.

No abstract available.

AD-A087 153/3 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
Current Status and Social Adjustment of U.S. Army Returned Prisoners of War.
Final rept.,
Ed Van Vranken. 1979, 11p Rept no. NAVHLTHRSCHC-78-38
Pub. in the Proceedings of the Annual Joint Medical Meeting Concerning POW/MIA Matters (5th), p53-57 Dec 79.

No abstract available.

AD-A087 189/7 PC **A04**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Psychology
A General Learning Theory and Its Application to the Acquisition of Proof Skills in Geometry.
Final technical rept.,
John R. Anderson. 20 Jun 80, 59p Rept no. TR-80-1
Contract N00014-78-C-0725

Generating a proof in geometry is analyzed into the stages of proof planning and proof generation. This report focuses on the processes of proof planning. In this stage the student searches for a proof tree which relates the givens to what is to be proven. This search is performed by operators that reason forward from the givens and that reason backwards from the to-be-proven statement. We discuss three types of learning which underlie this search. There is acquiring the operators in procedural form, learning to represent the problem in a way the operators can apply, and tuning the operators so that they will apply more appropriately. The paper focuses discussion on the first and third. The mechanisms underlying the first process are composition and instantiation. They transform information processing from interpretative application of procedural knowledge. The mechanism underlying knowledge tuning are analogy, generalization, discrimination, and composition. They serve to add further constraints to the productions that embody these rules. (Author)

AD-A087 247/3 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
The Influence of Visual-Spatial Ability and Study Procedures on Map Learning Skill.
Report for Jun 78-Jan 79,
Cathleen Stasz, and Perry W. Thorndyke. Jun 80, 41p Rept no. RAND/N-1501-ONR
Contract N00014-78-C-0042

This study investigated the influence of two sources of individual differences in knowledge acquisition from maps: abilities and learning procedures. Twenty-five subjects provided verbal protocols while attempting to learn two maps. Visual spatial ability was highly correlated with recall of spatial attributes of the map and with overall learning performance, while associative memory ability was most correlated with verbal attribute recall. Subject-selected procedures for encoding spatial information and assessing learning progress also distinguished the behavior of successful and less successful learners. However, subjects of high and low ability differed little in the study procedures they chose. although both ability differences and procedure use were important contributors to performance, a direct comparison of these sources of variation suggested that abilities are most predictive of map learning. These observations led us to the following conclusions: (1) the use of effective study procedures can influence map learning performance, and (2) high ability subjects benefit more from the use of these procedures than low ability subjects. (Author)

AD-A087 265/5 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Interhemispheric Asymmetries in Visual Evoked Potential Amplitude.
Interim rept.,
Christine L. Schlichting, David F. Neri, and Scott W. Kindness. 12 Jun 80, 13p Rept no. NSMRL-934

Interhemispheric differences in visual evoked potential amplitude (microvolts root mean square) were measured in five right-handed male subjects. Five different stimuli were used, and each subject participated in 3 similar test sessions. The stimuli included one gray, two vertical grids, and two random-dot textures. The results showed that interhemispheric asymmetries in amplitude are generally consistent for a given subject, and most subjects show greater amplitude in the right side of the brain. There was no differences among four of the stimuli in the degree of asymmetry elicited: one stimulus showed no asymmetry. Some of these stimuli will be used in a future study to determine if there is a relationship between the degree of hemispheric asymmetry and various performance measures in sonar operators. (Author)

AD-A087 272/1 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
A Review of USAFSAM Studies Employing Multiple-Task Performance Devices.
Final rept. Oct-Dec 79,
Bryce O. Hartman, Russell A. Benel, and William F. Storm. Jun 80, 19p Rept no. SAM-TR-80-16

Apparatus development at the USAF School of Aerospace Medicine to measure the performance and proficiency of systems operators is reviewed. The devices reviewed are all classified as multiple-task performance batteries that were designed to measure efficiency in the general sense. Simulators of specific systems were not included. The bulk of this paper consists of summaries of studies. (Author)

AD-A087 290/3 PC **A02**/MF **A01**
Michigan Univ Ann Arbor Research Center for Group Dynamics
Increasing Response Rates to Mail Questionnaires: Effects of Incentives and Certified Mail.
Technical rept. Sep 79-Mar 80,
John R. P. French, Jr., and Steven R. Doehrman. 25 Jun 80, 8p Rept no. TR-11
Contract N00014-78-C-0399

Two experimental manipulations were undertaken to improve the response rate to questionnaires mailed to Navy enlisted men who were joining the Fleet Reserve after twenty years of service. In a two by two design we studied the effects of giving $1 incentive payments and using certified mail. The data showed that incentives sharply increased response rate, in one mailing from 17% to 34%, but that certification had no effect. Explanations of the beneficial effect of incentives and the ineffectiveness of certified mail are discussed. (Author)

AD-A087 292/9 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Dept of Psychological Sciences
Benefits of Suffering: Communicator Suffering, Benefiting, and Influence.
Interim rept. no. 6,
Patrick A. Knight, and Howard M. Weiss. Jul 80, 38p
Contract N00014-78-C-0609

Two studies were conducted to examine the effects of an actor's suffering or benefiting upon observers' perceptions of the actor's honesty, independence and bias, their attributions for the actor's expressed opinions, and the actor's influence. In both studies, subjects read bogus newsmagazine articles about an individual who had taken a public stand on an issue and had either suffered, benefited or received no outcome as a consequence. The results of both studies showed that the suffering actor was rated as more honest, more independent, and less biased by subjects. The subjects also made more dispositional attributions for the suffering actor's expressed opinion and more situational attributions for the benefiting actor's opinion. Additionally, results of the second study showed that the suffering representative was more influential than the benefiting representative. Results are discussed in terms of their implications for influence and leadership in various settings, and their relationships to other research findings on attribution and persuasion. (Author)

AD-A087 308/3 PC **A04**/MF **A01**
RAND Corp Santa Monica CA
Individual Differences in Planning Processes.
Interim rept.,
Sarah E. Goldin, and Barbara Hayes-Roth. Jun 80, 73p Rept no. RAND/N-1488-ONR
Contract N00014-78-C-0039

This Note reports an initial investigation of individual differences in planning. Studying how individuals differ in their approach to planning may help us to understand the cognitive activity that underlies the development of a good plan and the factors that limit planning effectiveness, as well as producing prescriptive guidelines for improving planning. The research focuses on the analysis of thinking-aloud protocols produced by five subjects as they performed a set of errand planning tasks, and establishes patterns of individual differences in decision category usage that correlate with planning skill. Effective planners plan at a higher level of abstraction, possess a larger repertoire of planning knowledge and exhibit a greater degree of conscious control of their planning processes. Good and poor planners make essentially the same types of planning decisions, but good planners are more aware of tradeoffs between evaluation criteria. This research should interest cognitive scientists as well as practitioners concerned with improving planning. (Author)

AD-A087 356/2 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
Dear Anne.
Final rept.,
Anne Holberg. Jun 76, 20p Rept no. NAVHLTHRSCHC-76-51

The purpose of this study was to examine the effectiveness of the letter writing technique as an information-gathering instrument and to determine the importance of various facets of Navy life. In response to an informal, written query to comment about the Navy, 600 enlisted Navy men and women composed letters that they returned along with completed research questionnaires. After conducting a content analysis upon these letters, five categories emerged that included favorable

and adverse comments about: (1) officers and supervisors, (2) working conditions, (3) rules and regulations, (4) personnel utilization, and (5) other aspects of Navy life. To the majority of sailors, the relationship between superiors and subordinates was cited as extremely important and was associated with the job satisfaction variables of assuming responsibility, receiving encouragement and praise, being assigned to challenging jobs, and having opportunities for personal growth. This study showed that while the letter-writing technique proved effective as a means of collecting data, this method also provided the letter writer with an opportunity to 'air' his feelings about being in today's Navy. (Author)

AD-A087 385/1 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
User Experience with Modula for Programming a Real-Time Application.
Sharon M. McFadden. 1979, 6p Rept no. DCIEM-RP-80-P-05
Availability: Pub. in Proceedings of the Digital Equipment Computer Users Society, p865-870, Toronto, Ontario, Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-037 338/1 MF **A01**
Human Relations Research Group Univ of Calif Los Angeles
Motivational Factors in Productivity
ROBERT TANNENBAUM. 15 Feb 53, 10p
Contract nonr23309
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB80-204985 PC **A02**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Pikesville Nursing and Convalescent Center on February 8, 1979.
Final rept.,
John L. Bryan, and James A. Milke. 31 Aug 79, 20p NBS-GCR-80-236
Grant NBS-7-9014

The fire incident at the Pikesville Nursing and Convalescent Center on February 8, 1979 was initially detected by a laundress entering the laundry room. The laundress turned off the washing machine and also manually tripped the circuit breaker immediately after detection, which resulted in the extinguishment of the fire. The laundress then called the desk receptionist to initiate the facility emergency procedures and to notify the Baltimore County Fire Department. Patient room doors were closed by staff personnel and no patients were evacuated during this fire incident. Damage was limited to clothing inside the washing machine located in the basement of this two-story, 8 year old facility of protected non-combustible construction. The Baltimore County Fire Department responded and verified extinguishment.

PB80-204993 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incidents at the University of Maryland Hospital on February 6, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 31 Mar 79, 29p NBS-GCR-80-234
Grant NBS-7-9014

The fire incident at the University of Maryland Hospital on February 6, 1979 was detected by a nurse at approximately 0840 hours. The nurse was alerted to the observation of flames in a microwave oven in the emergency room doctor's lounge, room G-1142, by a loud unusual noise. The nurse immediately reported the fire at the emergency room treatment area nurses station. The hospital emergency procedures were initiated with a phone call to the University Communication Center and activation of the building local alarm system. The fire in the microwave oven was extinguished by the nurse using a 10 pound, listed carbon dioxide extinguisher, rated 5 B,C. Following extinguishment a light haze of smoke was confined to the doctor's lounge. One patient in an adjacent emergency room treatment area was evacuated as a precautionary action. The fifteen story North Hospital Building of fire resistive construction was approximately five years old. At the time of the fire incident the twenty-five patient emergency room treatment area had ten patients. The Baltimore City Fire Department responded and verified extinguishment.

PB80-205651 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Fire Protection Engineering.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the University of Maryland Hospital on April 4, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 31 May 79, 29p NBS-GCR-80-240
Grant NBS-7-9014

The fire incident at the University of Maryland Hospital on April 4, 1979 was detected by two nurses at approximately 2130 hours. The nurses observed light white smoke being discharged from a heating and air conditioning unit with electrical arcing in room 4-207. The two patients in the room were evacuated and the facility emergency procedures were initiated with the phone call to the University Communication Center and the activation of the building local alarm system. The fire was attacked by a nursing staff member with a listed 3A, 30BC rated, all purpose dry chemical extinguisher. All ten patients on wing 4B were evacuated, eight patients in their beds, and two of these patients required portable oxygen. The initial arriving fire department personnel from the Baltimore City Fire Department assisted in the evacuation of the last three patients. Fire department personnel extinguished the fire by disconnecting the electrical power supply to the unit and the fire then self-extinguished. The fire department removed glass from two openable windows in room 4-207 and 4-209 to achieve ventilation in this twelve story main hospital building of fire resistive construction.

PB80-207335 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Montgomery General Hospital on March 28, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 31 May 79, 28p NBS-GCR-80-239
Grant NBS-7-9014

The fire incident at the Montgomery General Hospital on March 28, 1979 was initially detected by a nurses aide on the fifth floor, west wing as an odor of smoke while she was in room 517 at approximately 0100. The nurses aide immediately notified the charge nurse. Both nursing personnel then investigated to determine the source of the smoke odor. A light haze of smoke was observed at the ceiling of room 516, and a smoldering fire approximately four to five inches in diameter, on the cotton bed spread of an occupied patient bed. The nursing staff removed the bed spread and top sheet to a bathroom across the corridor and extinguished the fire in a sink. One staff member remained with the patient, and following extinguishment, the nursing shift coordinator and the fire department was notified. The Sandy Spring Volunteer Fire Department responded and verified extinguishment. The facility local alarm system and verbal fire announcement were not initiated and no evacuation was conducted in this 7 story fire resistive building constructed in 1971.

PB80-207343 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Southern Maryland Hospital Center on January 2, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 28 Feb 79, 33p NBS-GCR-80-232
Grant NBS-7-9014

The fire incident at the Southern Maryland Hospital Center on January 2, 1979 was detected by a patient at approximately 0001 hours. The male patient in the psychiatric care unit on the fourth floor, west wing, reported to a nurse at the nurses station that there was an odor of smoke in the south corridor outside the closed door of vacant patient room 414. The nurse immediately initiated the facility fire emergency procedures with a phone call to the facility telephone operator. The telephone operator alerted the facility with a verbal 'Code Red' announcement over the public address system and phoned the Prince George's County Fire Communications Center on the '911' emergency number. The fire in a fiber glass waste container was extinguished by a male psychiatric patient using a 10 pound, listed all purpose dry chemical extinguisher, rated 5A, 60B, C. The smoke propagation was heavy in room 414, and moderate in the south corridor of the fourth floor, west wing. The smoke was confined to the west wing area by the smoke barrier doors. The smoke detector system in the psychiatric care unit, including room 414, activated immediately following extinguishment. The seventeen patients in the psychiatric care unit were all ambulatory and were evacuated to the fourth floor, east wing, following extinguishment for the duration of the night. The five and two story building of fire resistive construction was approximately thirteen months old. At the time of the fire incident, there were 17 patients in the 25 bed capacity psychiatric unit.

PB80-208986 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Fire Protection Engineering.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Crownsville Hospital Center on January 26, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 30 Jun 79, 28p NBS-GCR-80-233
Contract NBS-7-9014

The fire incident at the Crownsville Hospital Center on January 26, 1979 was detected by a patient at approximately 0420. The fire at detection consisted of a flaming linen bag in the linen room of ward 91 in the Medical-Surgical Building with flames to a reported height of four to five feet. The fire was reported by phone to the facility operator, and the local alarm system was activated, and the fire department notified. Approximately twenty-five patients were on ward 91 at the time of the fire incident. Fifteen patients were evacuated to ward 93. Nine patients were moved in beds, five were ambulatory and walked, and one was carried. Smoke spread through ward 91 due to the linen room door being left open, and the open plan design of the ward. The one story, fire resistive medical-surgical building was approximately twenty-two years old. The Anne Arundel County Fire Department responded and verified the fire extinguishment by a staff member with a five pound dry chemical listed extinguisher with a 5A, 10BC rating. The wet pipe automatic sprinkler system also activated from a single ordinary rated head. The fire department also performed salvage and overhaul operations.

5K. Sociology

AD-A086 950/3 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Dept of Psychological Sciences
Interaction of Social Influences and Task Experience on Goals, Performance and Performance Satisfaction.
Interim rept.,
Howard M. Weiss, and Thomas L. Rakestraw, Jr. May 80, 41p Rept no. 4
Contract N00014-78-C-0609

The effects of awareness of a model's task achievement on observers' task goals, performance, and performance satisfaction were studied in a laboratory setting. One hundred and seventy four subjects were exposed to either a high or low performing model in the context of viewing a task

'training film'. Approximately half of the subjects were allowed to practice the task before observing the film. All subjects then worked on the task and their goals, performance, and performance satisfaction were assessed. Results showed that observation of the model's achievement level had a significant effect on the goals and performance of subjects without prior experience, but had less influence on the goals and performance of subjects who were familiar with the task before being exposed to the model. However, regardless of task familiarity, subjects in all conditions used the model as a standard for evaluating their own performance. The results are discussed in terms of social factors which influence the goals individuals personally set when approaching tasks and the way organizational members seek to reduce uncertainty created by new task environments. (Author)

AD-A087 151/7 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
An Overview of the Family Studies Program at the Center for Prisoner of War Studies.
Final rept.,
D. Stephen Nice. 1979, 15p Rept no. NAVHLTHRSCHC-78-44
Pub. in Proceedings of the Annual Joint Medical Meeting Concerning POW/MIA Matters (5th), p9-16 Dec 79.

No abstract available.

AD-A087 317/4 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Dept of Psychological Sciences
Social Influences on Task Satisfaction: Model Competence and Observer Field Dependence.
Interim rept.,
Howard M. Weiss, and Christine E. Nowicki. Jun 80, 48p
Contract N00014-78-C-0609

Factors affecting the influence of social information on task satisfaction were studied in a laboratory setting. Specifically, the effects of a worker model's task competence and an observing worker's Field Dependence on the observer's adoption of the model's expressed task attitudes were examined with divergent prediction from Social Learning and Attribution research tested. Results showed the acceptance of social information to be an interactive function of model and observer characteristics. The task attitudes of Field Dependent subjects were influenced by the model's attitudes regardless of model competence. Among Field Independent subjects the Social Learning expectation of acceptance of the attitudes of competent models only was supported. Results are discussed in terms of differences in the processing of social information when job attitudes are formed. (Author)

PB80-204589 PC **A12**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Children, Nature, and the Urban Environment: Proceedings of a Symposium-Fair Held at the C. H. Marvin Center of the George Washington University, Washington, DC. on May 19-23, 1975.
Forest Service general technical rept. (Final). 1977, 262p NEFES/80-91, FSGTR-NE-30

The report contains 33 papers from the symposium-fair held 19-23 May, 1975 at the C.H. Marvin Center, the George Washington University, Washington, D.C. Sections are devoted to defining the role of natural environment, and community and institutional response to fostering desirable relationships between nature and development of urban children.

PB80-205560 PC **A06**/MF **A01**
National Center for State Courts, San Francisco, CA. Western Regional Office.
A Report to the Judicial Council on Witness Treatment in Criminal Proceedings. (California).
Apr 78, 103p

The report provides the Judicial Council of California with suggestions to improve handling of witnesses during criminal proceedings. Also included are suggested improvements which district attorneys' and public defenders' offices might consider in starting or expanding witness treatment programs or activities.

PB80-205578 PC **A06**/MF **A01**
Nevada Legislative Counsel Bureau, Carson City. Legislative Commission.
Problems and Treatment of Alcoholism and Drug Abuse.
Oct 78, 110p BULL-79-15

The 1977 Nevada legislature adopted Senate Concurrent Resolution 34 which directs the legislative commission to study the problems and treatment of alcoholism and drug abuse. The primary charge of that resolution is to make a comprehensive study of the feasibility of requiring health insurance policies to cover treatment for alcoholism and drug abuse. A legislative oversight subcommittee was designated to direct staff and provide guidance for policy decisions.

PB80-206634 PC **A17**/MF **A01**
Brookings Institution, Washington, DC.
Targeting Community Development,
Paul R. Dommel, Victor E. Bach, Sarah F. Liebschutz, and Leonard S. Rubinowitz. Jan 80, 377p HUD/PDR-540, HUD-0001480
Contract HUD-H-2323R
Report (3rd) on Brookings Institution Monitoring Study of the Community Development Block Grant Program.

The report focuses on the impact of the HUD targeting policy designed to direct a greater share of Community Development Block Grant (CDBG) program benefits to lower-income groups. The third and fourth years of the CDBG program, 1977 and 1978, are described. The monitoring research methodology involved a national network of resident observers who studied an agreed-upon set of process and program issues in communities where they live. The field associates based their analysis on available Government data, budget and program data, and interviews with key decision-makers. The central staff maintained contact with the associates, reviewed and coded the field data, and conducted the overall analysis. The field research was based on observations in 61 jurisdictions selected to take into account a mix of characteristics: (1) type of recipient--central city, satellite city, urban county, nonmetropolitan jurisdictions; (2) regional location; (3) population size; (4) income level; and (5) previous categorical grant experience. The report addresses legislative and regulatory issues that influence CDBG policy, and examines intergovernmental issues and the structure of local decisionmaking processes, as well as local program allocations and trends.

PB80-206642 PC **A06**/MF **A01**
Franklin Research Center, Philadelphia, PA.
Performance Data From the Residential Solar Demonstration Program, Interim Report.
1980, 116p HUD-0001492
Sponsored in part by Department of Energy, Washington, DC.

The document is a survey and analysis of current information from three performance-related data bases covering some of the solar homes built under the Residential Solar Demonstration Program. Results and conclusions in this report should not be viewed as final or definitive. However, the results are consistent in identifying the design and installation factors that help a solar energy system perform to its maximum potential. This information is being used to upgrade solar performance through system repair and redesign. Performance information is taken from three sources: data from instrumentation, utility bills of solar and comparative houses, and troubleshooting reports. Data from instrumentation show that only 2 of the 17 active space heating systems have performed up to predictions, but 3 of the 5 domestic hot water systems performed better than predicted. Data from utility bills comparing solar and regular houses show that over two-thirds of the solar houses used less total gas or electric energy than comparative houses in the same locales, but on a case-by-case basis, the comparison of the utility bills is highly variable. Information from troubleshooting reports shows that through all of the first three cycles, collectors remain the equipment for which the most problems were reported.

PB80-206667 PC **A05**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Special Assistant to the Secretary for Indian and Native Programs.
Indian and Alaska Native Housing and Community Development Programs; Annual Report to Congress FY 1979.
1 Dec 79, 89p HUD/S-506, HUD-0001476

The HUD annual report to Congress on Indian and Alaskan native housing and community development covers three topics: (1) housing assistance efforts undertaken in fiscal year 1979 and those planned for 1980; (2) 1979 progress in assisting Indian communities in meeting their community planning and development needs consistent with the revised legislation affecting Indian communities, and (3) other HUD assistance efforts related to the housing and community development needs of Indian communities. Measurable progress was made in program delivery, with housing construction starts at a record 4,599 units, and other production goals being met or exceeded. The fiscal performance of Indian Housing Authorities appears to have improved due to the revisions of the Housing and Community Development Act. This act removed the disadvantage faced by Indian tribes in competing for funding with small cities.

PB80-206691 PC **A04**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Housing and Urban Development (HUD) Housing Program Subsidy Model. User's Manual,
David Einhorn. May 80, 56p HUD-0001497

HUD's Office of Policy Development and Research has developed a set of models to estimate partial and full runout program subsidy costs to the Government for the Department's subsidized housing programs. These models were designed to recapture rates and to function under alternative assumptions regarding household income, family size, interest rates, discount rates, utility costs, construction costs, Government National Mortgage Association subsidies, and marginal tax brackets. A computer system was developed for these HUD housing program subsidy cost models. Each model simulates the direct and indirect costs of a housing program by permitting the user to change any of the model's assumptions of input variables, creating different examples of how a particular housing program might work. This manual presents an outline of a typical terminal session and discusses the actual operating procedures.

PB80-206709 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Housing and Urban Development (HUD) Housing Program Subsidy Model. Maintenance Manual,
David Einhorn. May 80, 25p HUD-0001496

HUD's Office of Policy Development and Research has developed a set of models to estimate partial and full runout program subsidy costs to the Government for HUD's subsidized housing programs. This manual describes how to maintain the case history file for the HUD housing program subsidy cost models. Each model simulates the direct and indirect costs of a different housing subsidy program by permitting users to change any of the model's input variables, such as income, deductions, interest rates, etc. This provides users with the capacity to create different examples of how a particular subsidy program might work. The users can formulate their own examples, or scenarios, then print, store, and retrieve them later. The bulk of the manual contains detailed instructions for using the four maintenance system capabilities.

PB80-206758 PC **A08**/MF **A01**
Urban Inst., Washington, DC.
National Housing Needs and Quality Changes During the 1980's,
John C. Weicher, Lorene Yap, and Mary S. Jones. Apr 80, 165p 1345-3, HUD-0001500
Contract HUD-H-2682

The report summarizes the results of an Urban Institute study to forecast the national need for new

housing construction in 1990. The study, which was done to enable HUD to forecast long-range production targets, consisted of (1) a forecast of housing demand over the decade of the 1980's, and (2) a projection of the extent of substandard housing in 1990. The forecast used Census Bureau projections of net new household formations and applied both traditional and analytical approaches. Different techniques were used to project other components of new housing demand including additional vacant units; replacement of losses from the existing stock; and units created by conversion, lost by merger, or added from nonresidential uses. Finally, the study attempts to analyze differing concepts of need in the construction of new housing and the replacement of substandard units.

PB80-207194 PC **E05**/MF **E05**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 3. Sweden.
Final rept.,
Ake E. Andersson, and Ingvar Holmberg. c1980, 113p RR-80-5
See also report dated 1979, PB80-168743. Prepared in cooperation with Goteborg Univ. (Sweden).

The purpose of this report is to give a detailed overview of the internal migration patterns and regional policies in Sweden. In the 1970s Sweden had a program for collecting vital statistics and other population data which allowed excellent opportunities for evaluating new techniques of population analysis. This program has few counterparts in other countries with respect to its completeness, coverage and exactness. This report discusses the administrative subdivisions of Sweden and the organization of the population statistics; as well as the settlement pattern of Sweden in a historical perspective. Other topics are: the current patterns of spatial population growth and its components, the problem of regional aggregation. Life Tables, Population projections, and fertility and migration analysis are presented as is an outline on population policies in Sweden.

PB80-207202 PC **A03**/MF **A01**
San Diego State Univ., CA. Center for Public Economics.
The Investment Decision in the Central City: A Consideration of Property Tax Abatement,
Dipak K. Gupta, and Louis M. Rea. Jun 77, 28p

Dilapidated and deteriorated housing in the large central cities of this country continues to be a largely unresolved social problem. Property tax abatement is one of several proposals that have been put forth and implemented to stem the tide of central city decay. This article develops an investment decision model which stipulates the conditions and circumstances under which a property tax abatement program will motivate investment in central city housing. The tax abatement program for the city of Pittsburgh is reviewed in light of this model and general recommendations are made for the successful implementation of such programs in the future.

PB80-207509 PC **A05**/MF **A01**
Massachusetts Univ., Amherst. Water Resources Research Center.
Public Attitudes Toward the Recreational Use of Drinking Water Reservoirs in Massachusetts,
Lawrence R. Klar, Jr., Walter H. Bumgardner, and Aldo Ghirin. May 80, 87p PUB-114, W80-06157, OWRT-A-107-MASS(1)
Contract DI-14-34-0001-9023
Prepared in cooperation with Southern Mississippi Univ., Hattiesburg. Dept. of Recreation.

This study identified public attitudes among Massachusetts residents toward the recreational use of drinking water reservoirs including Quabbin Reservation, the state's largest water supply source. Results were compared to the findings of two related studies on the same topic. The first assessed attitudes among recreational users of Quabbin Reservation and the second surveyed attitudes of water supply managers.

PB80-212095 PC **A02**
New York Sea Grant Inst., Albany.
Applied Geography. Mass Transit and Beach Access in New York City,
Charles A. Heatwole, and Niels C. West. Apr 80, 11p NYSG-RR-80-22, NOAA-80062407
Pub. in The Geographical Review, v70 n2 p210-217 Apr 80.

While local recreation planners are seeking ways to alleviate present and future beach crowding by the development of new beaches, they also are searching for ways to improve access to existing beaches so that urban residents, especially the relatively poor urbanite, may enjoy the opportunities offered by waterside facilities. Although the mass transit system of a city is bound to have a major role in this planning, little is known about the use of mass transit in comparison with alternative means of beach access. This report focuses on these access questions and seeks to provide some recommendations that may aid planning efforts.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A087 339/8 PC **A03**/MF **A01**
Avco Everett Research Lab Inc Everett MA
Immobilized Enzymes for Automated Analyses.
Final rept. 1 Sep 78-30 May 79,
George Herzlinger, and Jean Thompson. Dec 79, 36p SAM-TR-79-35
Contract F33615-78-C-0632

Methods were developed for analyzing enzyme immobilization processes applicable to carrier materials suitable for automated clinical chemistry analyzers. Immobilization was analyzed in terms of (a) amount of bound protein, (b) surface activity, (c) quantity of activating surface chemical groups on a carrier surface, and (d) total available carrier surface area. Carriers were utilized in the form of microfibers or microspheres so as to present very large specific surface areas for immobilization, 39,000 to 150,000 sq cm/g of carrier. The methods were applied to study of immobilization of glycerol dehydrogenase (GD). Three distinct types of immobilization processes were analyzed: (a) irreversible physical adsorption to nylon 6,6; (b) adsorption to charged amine-glass; and (c) dialdehyde-linked covalent coupling to amine-glass. Adsorption to nylon (process a) indicated the importance of nicotinamide adenine dinucleotide (NAD) during immobilization.

AD-029 646/7 MF **A01**
Chemical Lab Northwestern Univ Evanston Ill
Mediation by Metals of the Binding of Small Molecules by Proteins
ERVING M. KLOTZ, and W.C. LOH MING. 14 Sep 53, 10p
Contract nonr24500
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB80-207459 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Illustrated Handbook for High Resolution of IAA Oxidase-Peroxidase Isoenzymes by Isoelectric Focusing in Slabs of Polyacrylamide Gel.
Forest Service general technical rept. (Final),
Merrill C. Hoyle. 1976, 31p NEFES/80-95, FSGTR/NE-37

Specific techniques are presented for high resolution of peroxidase-IAA oxidase isoenzymes in polyacrylamide gel slabs by isoelectric focusing in pH gradients. Banding patterns are entirely reproducible. pH gradients are linear and there is no 'cathode shift.' The enzyme stains are very sensitive to low catalytic activity. Since the extreme cathodic or anodic isoenzymes of peroxidase-IAA oxidase enzyme have isoelectric points beyond the limits of wide range carrier ampolytes, it was necessary to adopt a more realistic definition of runtime. Also, a labeling scheme similar to that used in electrophoresis was adapted for isoelectric focusing by use of a standard 'marker isoenzyme.' The number of peroxidase-IAA oxidase isoenzymes revealed by this technique is more than twice that previously reported in the literature.

6C. Biology

AD-A087 145/9 PC **A02**/MF **A01**
Naval Medical Research Unit No 3 FPO New York 09527
Observations on the Subgenus Argas (Ixodoidea: Argasidae: Argas). 15. Identity of Argas (A.) magnus from Ecuador and Colombia.
Technical rept.,
Carleton M. Clifford, James E. Keirans, Harry Hoogstraal, and Pierre C. Morel. 1978, 12p Rept nos. NAMRU-3-TR.1/80, NAMRU-3-ACC-1175
Pub. in Jnl. of Medical Entomology, v15 n2 p158-165, 8 Feb 79. See also AD-A087 147.

No abstract available.

AD-A087 147/5 PC **A02**/MF **A01**
Naval Medical Research Unit No 3 FPO New York 09527
Observations on the Subgenus Argas (Ixodoidea: Argasidae: Argas). 16. Argas (A.) Morell, New Species, and Keys to Neotropical Species of the Subgenus.
Technical rept.,
James E. Keirans, Harry Hoogstraal, and Carleton M. Clifford. 1978, 10p Rept nos. NAMRU-3-TR.3/80, NAMRU-3-ACC-1177
Pub. in Jnl. of Medical Entomology, v15 n3 p246-252, 23 Mar 79. See also AD-A086 237.

No abstract available.

AD-A087 148/3 PC **A02**/MF **A01**
Naval Medical Research Unit No 3 FPO New York 09527
Crowding Effects on Fecundity of Argas (Persicargas) Arboreus (Ixodoidea: Argasidae).
Technical rept.,
Galila M. Khalil. 1979, 6p Rept nos. NAMRU-3-TR.7/80, NAMRU-3-ACC-1182
Pub. in Jnl. of Parasitology, v65 n2 p321-323 Apr 79.

No abstract available.

AD-042 752/6 MF **A01**
California Univ Los Angeles
Temperature Regulation and Water Requirements of the Brown and Abert Towhees, Pipilo Fuscus and Pipilo Aberti
WILLIAM R. DAWSON. 30 Sep 54, 10p
Contract nonr24600
No Foreign.
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB80-203318 PC **A03**/MF **A01**
Washington State Dept. of Fisheries, Olympia.
Improved Yield of Domestic and Imported Oyster Seed.
Completion rept. Jul 76-Sep 78,
Chris R. Jones. May 79, 27p NOAA-80060405

The recent trend of increasing dependence on domestic oyster seed in the Pacific Coast oyster industry has created a need for an evaluation of modifications of traditional oyster growing practices. Studies are being conducted to develop and test methods that improve the survival and growth

of oyster seed in general and to investigate possible modifications of cultural methods to be used with domestic seed to improve its productivity relative to Japanese oyster seed.

PB80-205594 PC A02/MF A01
Environmental Research Lab., Gulf Breeze, FL.
First Florida Record of 'Taphromysis louisianae' (Crustacea: Mysidacea).
Journal article,
T. L. Hamaker, and E. Matthews. 25 Apr 80, 4p
EPA-600/J-79-101, CONTRIB-393
Pub. in Northeast Gulf Science, v3 n2 p112-113 Dec 79.

First sighting of the mysid shrimp Taphromysis louisianae Banner, 1953, is reported from Milton, Florida in November 1978 and January 1979 in the Blackwater River estuary. The known range of this species is extended approximately 550 km eastward.

PB80-207020 PC A16/MF A01
Smithsonian Institution, Washington, DC.
Evolution of the Alimentary System in Myomorph Rodents,
N. N. Vorontsov. c1979, 375p TT70-53092
Contract NSF-C466
Trans. of mono. Evolyutsiya Pishchevari tel'noi Sistemy Gryzunov Mysheobraznye, Novsibirsk, 1967. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The work is intended for specialists in the field of mammalian taxonomy, ecology, comparative anatomy and paleontology. The extensive material drawn for study, also yielded the possibility of arriving at certain general laws of evolution. Special attention is paid to two problems: first to homology, parallelism and convergence in the structure of the rodent alimentary system, evaluation of the applicability of N.I. Vavilov's law of homologous series of inherited variability to supergeneric taxa and secondly, to the problem of biological coordinations, unequal rates of organic transformation in one functionally-bound system and substantiation of the principle of 'compensation of functions'. This second aspect of the general biological part of this book is ideologically connected with the studies of I.I. Schmalhauzen. It seems that certain general biological problems discussed in this book may be of specific interest not only to the riologists, but also to biologists with other specialized interests in the problems of evolution.

PB80-208903 PC A16/MF A01
Martin Marietta Corp., Baltimore, MD. Environmental Center.
A Review and Evaluation of Fisheries Stock Management Models. Part I. Text,
W. A. Richkus, J. K. Summers, T. T. Polgar, and A. F. Holland. 1980, 353p NOAA-80061110
Prepared in cooperation with Maryland Dept. of Natural Resources, Annapolis.

The major objective of this study is to assess the suitability of existing fisheries production and population models for use in the management of Maryland's tidewater fisheries.

PB80-212244 PC A07/MF A01
North Carolina Div. of Marine Fisheries, Morehead City.
Investigations of Anadromous Fishes of the Neuse River, North Carolina.
Completion rept. Jul 76-Sep 79,
Jess H. Hawkins. Jun 80, 145p NOAA-80062601

Investigations were made into the life histories of blueback herring, alewife, hickory shad, American shad, striped bass, and Atlantic sturgeon in the Neuse River, North Carolina. Sampling began on 1 June 1976 and extended to 20 September 1979, utilizing wing trawls, flat trawls, seines, plankton nets, and gill nets. Spawning areas were identified in the Neuse River for blueback herring, alewife, hickory shad, American shad, and striped bass.

6E. Clinical Medicine

AD-A086 934/7 PC A02/MF A01
Naval Medical Research Unit No 2 APO San Francisco 96528
Membrane Filtration Technique for Filariasis Surveillance, in Semarang.
Technical rept.,
Arhain Josoef, and David T. Dennis. 30 Mar 78, 7p Rept no. NAMRU-2-TR-821
Pub. in Bulletin Health Studies in Indonesia, v6 n1 p25-27 1978.

No abstract available.

AD-A087 122/8 PC A02/MF A01
American Foundation for Biological Research Rockville MD
Penetration Enzymes of Schistosome Cercariae.
Rept. no. 4 (Annual),
M. A. Stirewalt, and F. A. Lewis. 1 Jan 80, 25p
Contract N00014-76-C-0053

Cercarial penetration enzymes presented during percutaneous infection were antigenic but not protective. Sustained high cercarial production requires critical conditions of snail health and exposure age; exposure level; light and temperature. Saprophytic colonization of Biomphalaria glabrata immobilizes cercariae thus reducing cercarial output and infectivity. Schistosomules produced artificially are similar to those developing after skin penetration as assayed ultrastructurally and biologically. (Author)

AD-A087 132/7 Not available NTIS
Yale Univ New Haven CT Dept of Epidemiology and Public Health
Concurrently Circulating Hepatitis B Surface Antigen and Heterotypic Anti-HBs Antibody,
George L. LeBouvier, Roy A. Capper, Alan E. Williams, Marie Pelletier, and Alfred J. Katz. 2 Aug 76, 4p
Contract DADA17-70-C-0042, Grant PHS-5-S07-RR0-5443
Availability: Pub. in Jnl. of Immunology, v117 n6 p2262-2264 Dec 76 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 146/7 PC A02/MF A01
Naval Medical Research Unit No 3 FPO New York 09527
Chronic Salmonella Septicemia and Malabsorption of Vitamin A.
Technical rept.,
Moustafa M. Mansour, Mary M. Mikhail, Zoheir Farid, and Samir Bassily. 1978, 9p Rept nos. NAMRU-3-TR.2/80, NAMRU-3-ACC-1176
Pub. in the American Jnl. of Clinical Nutrition, p319-324 Feb 79.

No abstract available.

AD-A087 149/1 PC A02/MF A01
Naval Medical Research Unit No 3 FPO New York 09527
Hydrogen Ion Excretion and Urine Osmolality in Patients with Obstructive Uropathy Secondary to Schistosoma haematobium.
Technical rept.,
Stuart W. Young, Zoheir Farid, Samir Bassily, and Nabil A. El-Masry. 31 Jul 78, 8p Rept nos. NAMRU-3-TR.8/80, NAMRU-3-ACC-1183
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygienc, v73, n3 1979.

No abstract available.

AD-A087 150/9 PC A02/MF A01
Naval Medical Research Unit No 3 Fpo New York 09527
Gel-Diffusion and Complement Fixation Microtechniques for the Diagnosis of Histoplasmosis.
Technical rept.,
Michel E. Kerkor, Boulos A. M. Botros, and Ronald W. Moch. 1979, 12p Rept nos. NAMRU-3-TR.9/80, NAMRU-3-ACC-1184
Pub. in Jnl. of the Egyptian Society of Parasitology, v9 n1 p183-191 1979.

No abstract available.

AD-A087 161/6 PC A02/MF A01
Walter Reed Army Inst of Research Washington DC
Species Specificity of in vitro Escherichia coli Adherence to Host Intestinal Cell Membranes and Its Correlation with in vivo Colonization and Infectivity,
Christopher P. Cheney, Peter A. Schad, Samuel B. Formal, and Edgar C. Boedeker. 1980, 11p
Pub. in Infection and Immunity, v28 n3 p1019-1027 Jun 80.

No abstract available.

AD-A087 271/3 PC A02/MF A01
School of Aerospace Medicine Brooks AFB TX
Acute Optic Neuritis: Prognosis for the Development of Multiple Sclerosis.
Final rept. 1978-1979,
Patrick S. O'Connor. Dec 79, 13p Rept nos. SAM-REVIEW-4-79, SAM-TR-79-37

The literature was reviewed in regard to acute optic neuritis: prognosis for the development of multiple sclerosis, with specific reference to our flying population. Two major factors were found that influence the large discrepancy in statistics. The first was that the patient population, in many series, was preselected and not prospective, causing a higher incidence of later multiple sclerosis. The second factor was the definition of multiple sclerosis used by various groups. When strict criteria were followed for such definition, many of the apparently dissimilar series were, in fact, quite similar. Two series which most closely parallel our flying population are reviewed in detail. Both series suggest a very low incidence of later development of multiple sclerosis in patients affected with acute optic neuritis. This finding leads us to conclude that an incidence of 13% to 17% (calculated on life tables) most accurately represents the risk that our flyers who are afflicted with optic neuritis will later develop multiple scleros` (Author)

AD-A087 294/5 MF A01
Medical Coll of Wisconsin Milwaukee
Development of Non-Intrusive Automated Methods for Evaluation of Physiologic Function in Severely Traumatized Patients.
Rept. no. 4 (Final) 1 May 71-30 Jun 76,
Sanford J. Larson, James J. Ackmann, Joseph H. Battocletti, and Anthony Sances, Jr. 1 Sep 79, 21p
Contract DADA17-71-C-1093
Availability: Microfiche copies only.

The objective of this program is to further develop non-invasive patient monitoring techniques, specifically, evoked potentials, EEG, bioelectric impedance, and nuclear magnetic resonance (NMR) flow measurement; to determine the feasibility of applying these techniques in an automated system; and to access the efficacy of the methods for detecting early physiologic changes in severely traumatized patients. (Author)

AD-A087 302/6 PC A03/MF A01
Army Inst of Dental Research Washington DC
In vitro Effects of Ice, Skin Refrigerant, and CO2 Snow on Intra-Pulpal Temperature.
Rept. for Mar-Jun 80,
Robert A. Augsburger, and Donald D. Peters. 11 Jun 80, 30p

Three cold tests - ice, skin refrigerant, and C02 snow - were compared for their ability to decrease intrapulpal temperatures in vitro. A 5-second C02 snow application resulted in a statistically greater decrease than ice or skin refrigerant in both virgin and in crowned teeth. Although the amount of temperature change a pulp can withstand is not known, the 4 to 8F deg decrease produced by the C02 snow did not seen extreme. Temperature transfer between teeth in proximal contact was shown to be relatively insignificant. Advantages of C02 snow based upon clinical experience are discussed. (Author)

AD-A087 342/2 PC A03/MF A01
School of Aerospace Medicine Brooks AFB TX
USAFSAM Microprocessor Audiometer: System Reference Manual.
Final rept. Aug 77-Aug 79,

Michael L. Tworek, Jay H. Schlag, Donald C. Gasaway, and Harrell C. Sutherland. Apr 80, 29p Rept no. SAM-TR-80-8

A microprocessor audiometer was designed and built by USAFSAM personnel to investigate new techniques in audiometry and hearing conservation. The system's primary function is to provide a flexible test bed for developing new audiogram algorithms and implementing hearing-conservation decision criteria. Pertinent information regarding hardware and software implementation is provided. (Author)

AD-A087 379/4 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Purine Base and Nucleoside Uptake in Plasmodium berghei and Host Erythrocytes,
Brian D. Hansen, H. Kenneth Sleeman, and Peter W. Pappas. 7 May 79, 10p
Pub. in Jnl. of Parasitology, v66 n2 p205-212 Apr 80.

No abstract available.

AD-A087 381/0 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Presence of a Virulence-Associated Plasmid in Yersinia Pseudotuberculosis,
P. Gemski, Janet R. Lazere, T. Casey, and J. A. Wohlhieter. 1980, 6p
Pub. in Infection and Immunity, v28 n3 p1044-1047 Jun 80.

No abstract available.

AD-A087 450/3 PC **A05**/MF **A01**
Academy of Health Sciences (Army) Fort Sam Houston TX Health Care Studies Div
Nonproductive Factor Allowance. (Pilot Study).
Final rept. 1 Mar 78-31 Mar 80,
David F. Alexander, and A. David Mangelsdorff. 31 Mar 80, 95p Rept no. HCSD-80-002

The Chief Nurses, US Army Health Services Command and Office of the Surgeon General, Department of the Army (HQDA) are interested in the validity of the 1.11 nonproductive factor used in present staffing guides (AR 570-4, 17 Nov 75 and DA Pam 570-4, 8 Apr 74), especially for the Department of Nursing at the Army Medical Department activities. The purposes of the study were to determine the validity of the present factor, to identify other allowable categories of nonproductive time that should be used in determining the nonproductive factor, and to recommend a new nonproductive factor if the present factor is not valid. It was concluded that: (1) The present 1.11 factor does not appear to be valid for all MTFs; (2) A separate factor (or range of factors) according to facility size (MEDCEN, Large MEDDAC, or Small MEDDAC) would offer more appropriate standards; (3) Several additional categories of lost time have been identified for consideration in determining a new nonproductive standard; (4) A model, similar to the Air Force Standard Workweek and Man-Hour Availability, could be developed using the data from the identified categories of lost time; (5) Consideration could be given by the Secretary of Defense to using the models as standards for all Services in compliance with GAO recommendations; and (6) No new specific factor or model has been developed.

AD-037 973/5 MF **A01**
Chicago Univ Ill
Metabolic Changes Associated with Nerve Conduction
BENSON E. GINSBURG, and DOROTHEA S. MILLER. 31 Jul 54, 10p
Contract n6ori02037
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

HRP-0029308/4 PC **A04**/MF **A01**
Massachusetts Dept. of Public Health, Boston. Office of State Health Planning.
Criteria for Review of Institutional Plans.
Feb 78, 63p
Contract PHS-HRA-230-75-0175
Prepared in cooperation with Chi Systems, Inc., Ann Arbor, MI., and Stone, Marraccini, and Patterson, San Francisco, CA.

This report presents methods of reviewing hositals' 1- and 5-year plans. The report is specifically focused on the situation in Massachusetts, but its general principles are applicable elsewhere as well. Five different types of evaluations are presented: the completeness and internal consistency of each plan in what it proposes to accomplish; the relationship of one plan to the plans of other hospitals in the area to see if they offer or propose to offer the same services and facilities; the relationship of the hospital plan to agency plans to assure that the hospital plan is compatible with the guidelines established in the State health plan and State annual implementation plan, and health systems plans; financial feasibility of the hospital to see if it can affort to accomplish its plan, by analyzing the hospitals' debt service ratio, debt/asset ratio, and ratio of current assets to current liabilities (current ratio); and, finally, the feasibility and methodology of computerizing the hospitals' determination of need report and cost center report. An appendix includes the forms for the six types of submissions that hospitals must make in connection with their 1- and 5-year plans; forms for performing the above five types of evaluations are also included.

HRP-0029314/2 PC **A03**/MF **A01**
National Health Care Management Center, Philadelphia, PA.
Research Priorities for Health Systems Management.
Conference summary paper,
Sandra Frawley, Robert C. Jones, Jean Corman, and Joanne Levy. 1978, 31p
Grant PHS-HS-02577
Summary of a conference held at Washington, DC. on November 30-December 1, 1978.

The proceedings of a 1978 conference on research priorities for health systems management held in Washington, DC, are summarized. Participants included researchers, health care providers, and government officials. The management research needs addressed included horizontal multiunit systems, hospital sponsored ambulatory care; vertically integrated long-term care systems, new health manpower, and technology evaluation and diffusion. Each of these innovative areas was subjected to a panel discussion which resulted in recommendations for research priorities. These research priorities included motivating forces, enabling conditions, relationships among decisionmakers, organizational models and impacts of hospital sponsored ambulatory care, the role of the family in long-term care, models for vertical integration of long-term care, the cost-effectiveness and substitutability of new health manpower configurations, the role of physicians in new technology diffusion, and the causes of technology diffusion. Provided in the appendixes are a conference agenda, a list of conference participants, and descriptions of the National Health Care Management Center and the National Center for Health Services Research.

HRP-0030156/4 PC **A22**/MF **A01**
Georgetown Univ., Washington, DC. Graduate School.
An Evaluation of the Model Committee Staff Project.
Final rept.
c1977, 509p
Sponsored in part by Robert Wood Johnson Foundation, Princeton, NJ., and LEGIS/50 - The Center for Legislative Improvement, Denver, CO.

The goals of this study were (1) to demonstrate the value of full-time, professional staff members to the committees of State legislatures, and (2) to help State legislatures formulate sound public policy related to health. To accomplish those two main goals, several sub-goals, (indicators) were pursued in three categories: institutional indicators, output indicators, and process indicators. The institutional indicators included tracking changes in (1) the number of committee staff members, (2) the qualifications of committee staff members, (3) the number and qualifications of all other legislative staffers, and (4) legislative rules and procedures relating to committee operation. The output indicators included tracking changes in (1) specific health legislation enacted in the model States, (2) health expenditures, (3) health committee performance in terms of proposing, hearing, amending, and recommending legislation, (4) health committee performance in terms of the number of hearings and meetings held, and (5) staff workload in helping committees produce sound public policy. The process indicators were collected from personal interviews of legislators and others close to the legislative action on their attitudes toward the program. The States selected for study were Connecticut, Louisiana, Michigan, Minnesota, New Jersey, Texas, Washington, and Wyoming.

HRP-0030572/2 PC **A07**/MF **A01**
Rich (Robert F.) Associates, Lawrenceville, NJ.
Deinstitutionalization in Central Jersey: Trends and Strategies for Planning and Implementation,
Robert F. Rich, and Louise Haberman. Dec 78, 150p
Sponsored in part by Central Jersey Health Planning Council, Inc., Highstown, NJ.

The profiles of various client populations in New Jersey and the processes of institutionalization and deinstitutionalization are described relative to problems of alcohol, drugs, and developmental disabilities, and as they affect community-based agencies and institutions. The profiles of these service sectors include such characteristics as the current population profile, distribution of admissions by sex, age, ethnicity, race, and diagnosis, and trends in these distributions. Using the clients' profiles as a base, the analysis then turns to the process of institutionalization. A detailed examination discusses how individuals are first institutionalized, what their status is thereafter, and how their cases are managed throughout their stay. Comparisons are made between patients' diagnoses and the disposition of cases and between recidivism and length of stay. A study of two State hospitals was performed to determine how the process of deinstitutionalization operated. Although the data used were limited, they did show that more patients are being released to the community than in the past and that discharge planning needs to be improved in the areas of finances, housing, mental health services, and social resources.

HRP-0030830/4 PC **A09**/MF **A01**
Health Systems Agency of Northeastern New York, Inc., Albany.
Health Systems Agency of Northeastern New York: Operations Manual.
1977, 180p

This operation manual contains administrative and financial policies and internal procedures adopted by the Health Systems Agency of Northeastern New York. The format of the manual enables it to be updated by adding new documents or by replacing sections with revised versions. The manual's focus is on (1) articles of incorporation for the health systems agency (HSA); (2) HSA bylaws; (3) general administrative policies--public access to agency records and data, public inputs into agency activities, interagency organization agreements and planning coordination, agency board travel policies and procedures, staff travel policies and procedures, procurement and contracting, the use of consultants, and conflict of interest; (4) financial policies and procedures--financial management system objectives, accounting, financial control, budgeting, and financial management reports; (5) personnel policies and procedures--equal employment opportunity, recruitment and selection, conditions of employment, direct compensation, staff development, leave benefits, fringe benefits, staff performance review, corrective actions, grievance procedures, personnel records, job description, and petition summaries; and (6) general office procedures--property management. Planned additions to the manual pertain to general office procedures, such as agency filing systems and health planning library system and operation.

HRP-0031212/4 PC **A03**/MF **A01**
Texas Area 5 Health Systems Agency, Inc., Irving.
Blood Service Delivery Network in the United States and Dallas County: A Background Paper,
Lori Palmer. Sep 79, 47p

The blood service delivery system in the United States and in Dallas County, Texas, is examined. The composition and specific uses of blood are considered. Blood products include whole blood and a variety of forms of red blood cells. Five types of blood establishments are identified: community blood banks, military blood banks, hospital establishments, donor centers only, and plasmapheresis centers. National and regional regulations pertaining to the blood bank industry are reviewed. National trends indicate that charges to the patient for blood should be based on true cost and that standard cost mechanisms should be promoted to achieve equitable cost structures. The blood bank complex in Dallas County is detailed, and seen to comprise whole blood collection centers, transfusion facilities, and plasmapheresis centers. Tabular data displays the distribution of blood establishments in Dallas County. Various methods of collection and donor recruitment are identified. Observations, concerns, and needs related to the blood service system in the county are summarized.

HRP-0031236/3 PC **A05**/MF **A01**
Oklahoma Interagency Task Force for Health Manpower Data, Oklahoma City.
Proceedings of Annual Governor's Conference on Health Manpower (2nd), Held at Oklahoma City, Oklahoma on September 14-15, 1977: The Role of Health Personnel in Promoting Wellness, Self-Sufficiency and Self Care,
Vivian S. Smith. 1977, 99p

The issues addressed in this collection of papers, panel discussions, and group reports include: the roles of health personnel and the consumer in promoting wellness and self-sufficiency in health care, the impact of provider payment methods on wellness and self-sufficiency, regional initiatives in education for health care (the decentralization of health professions education), community views of education for health care, maintaining practitioner competence for pharmacists, (which reviews needs of older pharmacists, younger pharmacists, women pharmacists, and the patients). The discussion on provider payment methods concentrates on the different demands for health care services that arise from three different payment mechanisms: fee-for-service, all fees paid by a third party (as in some of the proposals for a national health insurance plan), and a combination of the two--most of the costs paid for by a third party but the patient still required to pay a fee at the time of the visits. The third method would make the adoption of effective health education and preventive services much more likely. Included in appendices are a description of the Oklahoma Interagency Task Force for Health Manpower Data and the Oklahoma Health Manpower Categories.

HRP-0101301/0 PC **A05**/MF **A01**
Orkand Corp., Silver Spring, MD.
Determining Health Manpower Requirements: An Overview of Planning Agencies' Decisions and Methods.
Aug 79, 92p DHEW/PUB/HRA-79-14033, BHP/HPMTS-13
Contract PHS-HRA-231-77-0083

Health manpower requirements in the context of planning were studied, with an emphasis on planning agencies created under the National Health Planning and Resources Development Act (health systems agencies, State health planning and development agencies, and statewide health coordinating councils). Background issues, influencing decisions made by planning agencies about manpower requirements and the allocation of resources to meet these requirements, involved: the policy context in which agencies determine manpower requirements; the comprehensive nature of manpower issues; and the relationship between health plan development and the determination of manpower requirements. Eight decision points, to help agencies establish a process for estimating manpower requirements, were to (1) identify persons/organizations to be involved in the process and determine how they will be incorporated; (2) identify objectives; (3) select types of manpower to be studied; (4) determine the period of time for which requirements will be estimated; (5) identify level of aggregation for analysis; (6) determine existing and potential staff capabilities; (7) select the method for estimating requirements; and (8) determine necessary data and data availability. Findings of the study regarding methods used to estimate manpower requirements are appended.

HRP-0101401/8 PC **A07**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Coordination: Health Planning and Community Mental Health,
Beaumont R. Hagebak. Aug 79, 136p BHP/HPMTS-14, DHEW/PUB/HRA-79-14041
Prepared by Alcohol, Drug Abuse, and Mental Health Administration, Rockville, MD.

Similarities between health systems agencies (HSA's) and community mental health centers (CMHC's) and incentives for coordination between the two types of agencies are reviewed. Because of rising health care costs and greater limitations on health care resources, and difficulties faced by health planning agencies with regard to reduced budgets and funding limitations, the book is designed to facilitate the sharing of computer and library services, agency staff expertise, and efforts to minimize costly duplication in activities and encourage coordination. Three assumptions form the basis of the report: (1) the impact of coordinated planning on clients is greatest at the local level; (2) the unique character of program and political realities varies from community to community, even though HSA's and CMHC's in all comunities share common barriers to coordination, and have common attitude rather than specific technique is the key to successful planning coordination. Both HSA's and CMHC's are detailed in terms of their purpose, legislative background, and administrative systems. Problems in and barriers to coordinated planning are identified, as well as incentives for closer coordination. Alternatives and options for consideration by HSA and CMHC administrators and planners who decide to collaborate in planning efforts are suggested. Appendixes contain a list of references and a glossary.

HRP-0902001/7 PC **A13**/MF **A01**
Educational Testing Service, Princeton, NJ.
Course on Community, Involvement and Public Information. Leader's Guide.
1979, 285p
Contract PHS-HRA-230-75-0064

A videotape presentation and a teaching guide comprise this course manual on community involvement and public information. The course is intended to aid health systems agency (HSA) personnel, including board members, executive directors, and staff members. Five teaching points are stressed: (1) individuals and organizational entities in the health planning process are interdependent; (2) an HSA's mission, purpose, and place in the community must be defined; (3) an HSA must do more than legally acknowledge the community; (4) HSA personnel must understand tools and techniques in community involvement and public information; and (5) a systematic approach to and planning for community involvement and public information are essential. The script of the videotape, with a playing time of 18 minutes, is keyed to the teaching guide. The case study demonstrates how a random and inadequate approach to community involvement and the dissemination of public information can be costly and disruptive and waste staff time, energy, and resources by focusing on the failure of an HSA. General information for trainers is provided, along with information on community involvement and public information processes. Structural and management aspects of community education and participation are considered. Additional resource materials are identified.

HRP-0902191/6 PC **A18**/MF **A01**
Washington Univ., Seattle. School of Medicine.
Evaluation Reports: Admissions and Faculty Sharing (WAMI (Washington, Alaska, Montana and Idaho) Project). Volume III,
M. Roy Schwarz. 1979, 424p
Contract PHS-HRA-231-77-0093
See also Volume 2, HRP-0902190. Report on WAMI Project.

The admissions portion of the Washington-Alaska-Montana-Idaho (WAMI) Communications Technology Satellite (CTS) experiment is the product of continued interest by the University of Washington School of Medicine (UWSM) in maximizing the communications bridges among its widely dispersed training facilities. The UWSM is the only medical school in the WAMI region and has therefore been the center for training health care delivery personnel for this vast section of the Pacific Northwest. Due to these unusual responsibilities as a regional rather than just a state health science training institution, the UWSM has attempted to create a cohesive yet decentralized network of training facilities. Recent experiments have used satellite communication to promote identification and interaction among outlying training sites--while keeping the regional flavor intact.

INIS-mf-4520 PC **A08**/MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Inst. de Biofisica.
Hyperfunctioning Nodules of the Thyroid. A Study on the Kinetics of Iodine and a Critical Analysis of Functional Autonomy.
D. Rosenthal. 1975, 166p
In Portuguese.Tese (Ph.D.).
U.S. Sales Only.

Iodine kinetic studies, using a double label (exp 131 I exp - and T sub 4-125 I), were performed on 8 patients with hot thyroid nodules, 3 diffuse toxic goiters and one normal control. This investigation was complemented by partial kinetic studies done on 62 other subjects, including normal controls and euthyroid or hyperthyroid patients with diffuse or nodular goiter. (Atomindex citation 09:414615)

INIS-mf-4523 PC **A03**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro.
Aspects of Radioisotope Utilization in Clinical Medicine.
A. F. G. Rocha, C. A. de Lima e Forti, M. da C. Cunha, and O. de Souza Maciel. 1973, 33p
In Portuguese.
U.S. Sales Only.

A revision concerning radioisotope use in medicine has been done. The harmlessness and effeciency of radioisotopes are shown. Techniques and advantages of tracers used for brain scintiscanning, lung scintiscanning, liver scintiscanning, spleen scintiscanning, bone scintiscanning and thyroid scintiscanning are described and images of them are presented. (Atomindex citation 09:414592)

JINR-14-11330 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Using of Heavy Charged Particles for Radiography. Review.
Yu. V. Zanevskii, V. D. Peshekhonov, I. N. Semenyushkin, G. V. Makarova, and A. I. Ruderman. 1978, 37p
In Russian.
U.S. Sales Only.

Many modern accelerating complexes are carrying out investigations into the use of accelerated protons and multi-charge ions for radio therapy, as well as for radiography. The systematized generalization of experimental results on proton and ion radiography is given. (Atomindex citation 10:491298)

PB80-205701 PC **A03**/MF **A01**
Harvard School of Dental Medicine, Boston, MA. Harvard Tooth Implant-Transplant Research Unit.
Influence of Root Surface Design on Implant Acceptability in Baboons.
Final rept. 18 May 73-17 Jan 77,
Leonard B. Shulman, Paul A. Schnitman, Milton Hodosh, Lawrence Gettleman, and Robert Feingold. Jun 80, 38p NIDR/CR-80/8
Contract N01-DE-3-2422

The effect of root surface design on dental implant acceptability in baboons was studied using three basic configurations (smooth, grooved, and perforated) on polymer replica implants fabricated with standard or porous polymethyimethacrylate (PMMA). The implants were tested in anterior and posterior sites. Surface grooves and root perforations were found to improve PMMA replica implant retention but not firmness. The addition of anorganic bone and foaming agents to standard PMMA did not enhance replica implant acceptability. Polymer replica implants were found to be more retentive and firm in posterior sites than in anterior sites. PMMA replicas were generally found not self-sup-

porting in anterior sites. Anterior sites appear to be inhospitable to dental implants in baboons. Since anterior sites in baboons are quite vulnerable to trauma, studies involving them must incorporate special animal handling.

PB80-206113 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. School of Medicine.
Surveillance of Pneumococcal Infection for Field Trials of Polyvalent Pneumococcal Vaccines.
Final rept. 1 Jun 73-31 Dec 79,
Robert Austrian. 15 Jan 80, 37p DAB-VDP-12-84
Contract N01-AI-32517
See also report for Feb 74-Jan 75, PB-244 217.

This report summarizes the work resulting in the licensure of a 14-valent vaccine of pneumococcal capsular polysaccharides for the prevention of pneumococcal infection in man. It contains data on the prevalence of pneumococcal capsular types causing pneumonia, meningitis and otitis media in the U.S.A., levels of antibodies resulting from immunization of volunteers with the capsular polysaccharides of 15 pneumococcal types administered in several doses and in monovalent or in polyvalent formulations, the reactions resulting from injection of monovalent and of polyvalent vaccines and the efficacy of the vaccine in the prevention of pneumococcal infection of the respiratory tract and of pneumococcal bacteremia. The vaccines have been shown to be safe and 80 per cent effective in preventing those pneumococcal infections caused by types the capsular antigens of which are included in the vaccine in three field trials, one involving 1300 subjects in a hospitalized population, a second including 13,600 members of an American prepaid health plan over the age of 44 years and a third involving 12,000 novice gold miners in South Africa.

PB80-207392 PC **A03**/MF **A01**
New York State Consumer Protection Board, Albany.
The Impact of Blue Shield Boards of Directors on the Cost of Health Care in New York State,
Rosemary S. Pooler. 12 Apr 77, 36p

Contents:
- Blue Shield--What it is and what it does;
- The present system;
- The six Blue Cross plans outside of Greater New York;
- Blue Cross/Blue Shield of Greater New York;
- How these provider-dominated boards influence the cost of medical care:
- A lack of other controls;
- The Philadelphia story--Better consumer representation.

PB80-207426 PC **A08**/MF **A01**
Texas Univ. at San Antonio. Center for Applied Research and Technology.
Human Enteric Virus Survival in Soil Following Irrigation with Sewage Plant Effluents.
Final rept. 28 Jul 75-27 Jan 79,
Bernard P. Sagik, Barbara E. Moore, and Charles A. Sorber. Jun 80, 154p EPA-600/1-80-004
Grant EPA-R-803844-03

The wastewater treatment processes at Kerrville and Uvalde, Texas, were evaluated in terms of their efficacy in reducing human enteric viruses. (Data on the reduction of TOC, BOD5, suspended solids, orthophosphate, nitrogenous compounds, total coliform, fecal coliform, and bacteriophage were also obtained). Enteric viruses were reduced by greater than 99% at Kerrville and at least 99% at Uvalde. These waters are used for irrigation without disinfection. Soil samples at the Kerrville and Uvalde application sites yielded both fecal coliforms and bacteriophages. In addition, two confirmed enterovirus isolations were made at the Kerrville site. Lysimeters placed 1.5 ft, 3.0 ft, and 4.5 ft depths at the Kerrville site yielded large numbers of bacteriophage isolates. In addition, ten lysimeter samples yielded a total of 29 confirmed viral isolates. This is a strikingly high number of isolations of indigenous enteric viruses, relative to the irrigation pond which was demonstrably low in viruses (when assayed on the same cell lines). Cell changes (CPE) but no confirmed isolations were made from five monitoring wells. These studies of wastewater treatment plants processing dilute to moderate strength sewage in efficient treatment schemes represent a 'best possible case' for the use of undisinfected, domestic wastewater effluents for irrigation. The isolation of enteroviruses in water from lysimeters but not from the monitoring wells suggests that depth to groundwater should be a critical factor in the selection of irrigation sites. From data developed in this study, it appears that a depth of 4.5 ft is not sufficient for effective viral attenuation in soils such as those described in this report.

PB80-207475 PC **A05**/MF **A01**
Michigan Dept. of Public Health, Lansing. Div. of Health Care Systems.
Meeting the Health Needs of American Indians and Migrant Farm Workers in Michigan.
May 78, 84p

The purpose of this paper is to report the proceedings of the Inter-Agency Advisory Committee on Meeting the Health Needs of Migrants and American Indians. The Committee members met, several times during the months, soon after the organizational meeting. After each meeting it became increasingly evident that working subcommittees, organized along 'Migrant interests' and 'Indian interests', were necessary in order for the members to thoroughly study their respective subjects. While the ideal way to report each of the subcommittee proceedings would be to discuss the intended implementation for each Recommendation, this option is precluded due to the autonomy of the various health care providers of migrant services and similarly the autonomy of the organizations serving the Indian causes. This paper reports the result of the proceedings of each of the subcommittees and is organized in two parts. The first, reports the work of the Indian subcommittee; the second, the conclusions of the the migrant subcommittee.

PB80-207830 PC **A03**/MF **A01**
National Inst. of Neurological and Communicative Disorders and Stroke, Bethesda, MD.
Febrile Seizures Bibliography,
Judy Lim-Sharpe, Mary Fitzpatrick, B. G. White, and Roger Porter. May 80, 40p

The bibliography is a compilation of the literature on febrile seizures. It was prepared for the National Institutes of Health Consensus Development Conference on Febrile Seizures held May 1980.

PB80-208390 PC **A02**/MF **A01**
National Commission on Air Quality, Washington, DC.
Report to the National Commission on Air Quality on the Benefit Methodology Evaluation Panel.
Final rept.
May 80, 18p AQ-100

The Benefit Methodology Evaluation Panel was convened by the National Commission on Air Quality to evaluate methods for the estimation of benefits resulting from enhanced air quality. The Panel assessed the relative merits of alternative approaches taken in major studies for estimating benefits of air pollution control. The Panel focused on human health issues and recommended that the Commission review major macroepidemiological studies; that standardized methods of measuring morbidity be developed; and that the Commission should not include benefit estimates in its regional studies.

PB80-211741 PC **A06**/MF **A01**
Geomet, Inc., Gaithersburg, MD.
Directory of Federal Interagency Groups Concerned with Environmental Health (Second Edition).
Apr 80, 116p
Contract EPA-68-01-5773

This document is a reference directory that describes 33 interagency committees and their subcommittees or components that deal with environmental health. The directory was developed and compiled by the interagency Task force on Environmental Cancer and Heart and Lung Disease. The directory is intended to promote coordination and information exchange among the listed groups and the Agencies and institutions involved in identifying problems and initiating research in environmentally related cancer and heart and lung diseases. Information reported for each committee includes membership listings and Agency affiliations, charter, statement of activities and accomplishments, listing of publications, products, meeting schedule, committee duration, and work groups. This is the second edition of the directory. The member Agencies of this Task Force include: Environmental Protection Agency; National Cancer Institute; National Heart, Lung and Blood Institute; National Institute for Occupational Safety and Health; National Institute of Environmental Health Sciences; National Center for Health Statistics; Center for Disease Control; and Food and Drug Administration.

PB80-929412 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Biochemical, Immunological, and Cytological Studies for Diagnosis of Cancer.
30 Jul 80, 92p NCI/ICRDB/SL-344
Supersedes NTISUB/E/294-018.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Biochemical studies and hormone analysis for diagnosis of cancer; Immunologic studies for the detection of cancer and monitoring of disease course; Cytological studies for the presence or progression of cancer; Other studies including broad studies for diagnosis of cancer.

6F. Environmental Biology

AD-A087 143/4 PC **A04**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Guide for Fish Kill Investigations.
Technical guide,
Carl A. Bouwkamp. 9 May 80, 59p Rept nos.
USAEHA-32-24-0193-80, USAEHA-TG-116

This technical guide was written to serve as an aid in solving fish kills locally by Army installations and give specific guidance on this Agency's role in assisting with fish kill investigations. Possible causes of fish kills, possible preventive measures, and preparing for/conducting fish kill investigations are the major topics discussed. (Author)

PB80-208952 PC **A07**/MF **A01**
Interagency IPM Coordinating Committee, Washington, DC.
Progress Made by Federal Agencies in the Advancement of Integrated Pest Management. Report to the President.
30 Jun 80, 139p
Sponsored in part by Council on Environmental Quality, Washington, DC.

This study was prepared in response to the President's directive of August 2, 1979, in which he established the Interagency Integrated Pest Management Coordinating Committee and instructed the Committee to report on progress made by Federal agencies in advancing IPM and on institutional barriers preventing progress. This report addresses national IPM policy, progress, barriers, and recommendations.

PB80-211998 PC **A08**/MF **A01**
National Training and Operational Technology Center, Cincinnati, OH.
Bacteriological Methods in Water Quality Control Programs: Training Manual,
Rocco Russomanno. Apr 80, 159p EPA-430/1-80-004
Supersedes PB-235 902.

This Training Manual is designed for laboratory personnel who can perform basic bacteriological procedures such as sample inoculations, transfers, weighings, and related skills. The manual contains theoretical information and analytical procedures for parameters listed in the Federal Regis-

ter (Wednesday, December 1, 1976, Part II) Water Programs: Guidelines Establishing Test Procedures for the Analysis of Pollutants. Procedures are as described in the Standard Methods for the Examination of Water and Wastewater, 14th Edition, 1976. It is written in an outline form.

6K. Life Support

PATENT-4 193 966 Not available NTIS
Department of the Navy Washington DC
Carbon Dioxide Absorbent Cannister with Condensate Control.
Patent,
Ronald W. Dowgul. Filed 15 Jun 78, patented 18 Mar 80, 5p AD-D007 384/1, PAT-APPL-915 635 Supersedes PAT-APPL-915 635-78, AD-D005 594.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of Patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A carbon dioxide absorbent cannister in underwater breathing apparatus of the forced recirculation type. The canister includes a plurality of stackable condenser elements that serve to cool exhaled gas of high relative humidity so that water, necessary to the desired carbon dioxide removing reaction, is condensed from the gas. The condenser elements are characterized by a plurality of radial, blade-like legs, the outer ends of which are in heat transfer relation to the canister wall, and by a conical diffuser disc that serves as a heat sink. (Author)

6L. Medical and Hospital Equipment

AD-A087 064/2 PC **A02**/MF **A01**
Army Inst of Dental Research Washington DC
'Low-Gold' Crown-and-Bridge Alloys,
Eugene F. Huget, Stanley G. Vermilyea, and Jesus M. Vilca. 16 Jul 80, 14p

Composition, microstructure, mechanical properties and heat treatment characteristics of three low-gold dental casting alloys were studied. The materials exhibited vast compositional differences but strikingly similar structural features. Overall, the laboratory properties of the test materials suggest their potential usefulness for the production of fixed dental prostheses. (Author)

AD-A087 112/9 PC **A02**/MF **A01**
Army Inst of Dental Research Washington DC
Accuracy of Small Base Metal Dental Castings,
Eugene F. Huget, Stanley G. Vermilyea, and Michael J. Kuffler. 10 Jul 80, 13p

The obvious and important advantage of low cost offered by the test base metal alloys is countered by their inadequate casting accuracy. Until this problem can be overcome, the acceptance of such alloys for routine use in military dental practice is not warranted. (Author)

6M. Microbiology:

AD-A087 388/5 PC **A02**/MF **A01**
Egyptian Organization for Biological and Vaccine Production Agouza Cairo
A Serological Survey for Thogoto Virus in Humans, Domestic Mammals, and Rats in Egypt,
Medhat A. Darwish, Harry Hoogstraal, and Ferial M. Omar. 1979, 12p NAMRU-3-TR-12/18, NAMRU-3-ACC-1187
Contract N00014-74-C-0391
Pub. in Jnl. of the Egyptian Public Health Association, v54 n1/2 p1-8 1979.

No abstract available.

PB80-209372 PC **A02**
Texas A and M Univ., College Station. Sea Grant Coll. Program.
Relationships Between Environmental Factors, Bacterial Indicators, and the Occurrence of Enteric Viruses in Estuarine Sediments,
Raymond LaBelle, Charles P. Gerba, Sagar M. Goyal, Joseph L. Melnick, and Irina Cech. Mar 80, 12p TAMU-SG-80-815, NOAA-80061302
Grant NOAA-04-7-158-44105
Prepared in cooperation with Baylor Coll. of Medicine, Houston, TX. Dept. of Virology and Epidemiology., and Texas Univ., Houston. School of Public Health. Pub. in Applied and Environmental Microbiology, v39 n3 p588-596 Mar 80.

Current standards for evaluation of the public health safety of recreational and shellfish-harvesting waters are based upon bacteriological analysis, but do not include an evaluation of the number of viruses. The objective of this study was to determine the occurrence of enteric viruses in estuarine sediments and to find a relationship, if any, between the presence of viruses in seawater or sediment or both and various biological and physicochemical characteristics of the environment. Viruses were found in greater numbers in sediment than in overlying seawater on a volume basis. Several types of enteroviruses were isolated: coxsackievirus types A16, B1, and B5, echovirus type 1, and poliovirus type 2. On several occasions, viruses were isolated from sediments when overlying seawaters met bacteriological water quality standards for recreational use. Statistical analysis of the relationship between viruses in seawater or in sediment and other variables measured yielded only one significant association: the number of viruses in sediment was found to be positively correlated with the number of fecal coliforms in sediment. No other physical, chemical, or biological characteristic of seawater or sediment that was measured showed statistically significant association with viral numbers. No correlation was found between bacterial indicators and virus in the overlying waters.

PB80-209398 PC **A02**
Louisiana State Univ., Baton Rouge. Dept. of Microbiology.
Characterization of a Flagellar Sheath Protein of 'Vibrio cholerae',
K. W. Hranitsky, A. Mulholland, A. D. Larson, E. R. Eubanks, and L. T. Hart. Feb 80, 10p LSU-R-80-002, NOAA-80061303
Grant NOAA-04-8-M01-154
Pub. in Infection and Immunity, v27 n2 p597-603 Feb 80. Prepared in cooperation with Arizona State Univ., Tempe.

A flagellar sheath protein of Vibrio cholerae CA401 (inaba) was characterized. Purity of the preparation was indicated by a single band on polyacrylamide gel electrophoresis gels and on Ouchterlony plates prepared with antibody against crude sheath material. The sheath protein was composed of three polypeptides with minimal molecular weights of 61,500, 60,000, and 56,500. The presence of sheath protein on the flagellum as well as on the outer membrane of the cell was demonstrated by ferritin labeling experiments with antiserum. Sheath protein antibody reacted similarly in labeling experiments and agglutination tests with a classical Ogawa strain and two nonagglutinating V. cholerae isolates, indicating that the sheath protein may represent the common Vibrio H antigen. Antibody specific for lipopolysaccharide labeled the cell but not the sheathed flagellum, which demonstrated that the sheath is not a simple extension of the outer membrane of the cell.

6N. Personnel Selection and Maintenance (Medical)

AD-A086 936/2 Not available NTIS
Naval Submarine Medical Research Lab Groton CT
The Effects of Astigmatism on Sensitivity to Sinusoidal and Square Wave Gratings,
Jo Ann S. Kinney. 4 Dec 79, 6p
Availability: Pub. in American Jnl. of Optometry and Physiological Optics, v57 n6 p372-377 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

6O. Pharmacology

AD-A087 376/0 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Nucleic Acid Complexing Compounds,
Fred E. Hahn. 1980, 24p
Pub. in Antibiotics Chemotherapy, v27 p70-92 1980.

No abstract available.

AD-A087 378/6 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Virus Chemotherapy: The Problem, Its Development and Nature,
Fred E. Hahn. 1980, 22p
Pub. in Antibiotics Chemotherapy, v27 p1-21 1980.

No abstract available.

6P. Physiology

AD-A087 320/8 PC **A02**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Ship Bridge Lighting: Red or White.
Technical communication,
D. Pearce, R. Angus, and L. Olsen. Dec 79, 20p
Rept no. DCIEM-TR-80-C-23

Although the superiority of red lighting over white in terms of subsequent dark adaptation is well-documented, the operational significance of this superiority is difficult to quantify. More operationally relevant measures are required in order for the user to evaluate the relative advantages and disadvantages of each type of lighting. The present study provides data showing the advantage of red pre-adaptation in terms of visual detection range superiority for simulated-ship targets. In addition, the merits of red lighting for the 'darken ship' condition are discussed. (Author)

6Q. Protective Equipment

AD-A087 116/0 PC **A03**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Cold Regions Environmental Test of Boot and Similar Footwear.
Final rept. on Test Operations Procedure.
9 May 80, 30p Rept no. TOP-10-3-512
Supersedes Rept. no. MTP-10-4-006 dated 23 Jun 69, AD-719 259.

This TOP prescribes methods for evaluation of footwear undergoing cold climate testing. It contains procedures for use in evaluation of functional suitability, compatibility with arctic clothing and equipment operation, durability, troop acceptability, maintainability, and safety. It contains facility and instrumentation requirements for the accomplishment of testing. (Author)

AD-A087 319/0 PC **A02**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Adhesive Coatings for DH-411 Helmets.
Technical communication,
J. C. Lazowski, and J. W. Adams. Jan 80, 18p
Rept no. DCIEM-TC-80-C-02
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Helicopter helmets in the Canadian Forces are required in two interchangeable roles, white and camouflaged. At present, helmets used by members of tactical helicopter squadrons are painted

green to achieve the camouflage effect. Painting and stripping of helmets are time-consuming tasks which may deteriorate the impact protection of the helmet. Two adhesive coatings, olive drab gun tape and an adhesive vinyl coating in a disruptive pattern, were evaluated to determine the effect of extremes of temperature upon the coatings and the coated helmet shell. It was found that a marked discolouration of the helmet shell occurred during seven-hour exposures to 200 f when coated with olive drab gun tape. It is concluded that the adhesive vinyl coating is superior to the gun tape on the basis of appearance and discolouration of the helmet shells. (Author)

6R. Radiobiology

AD-A087 008/9 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Ardrox Hand Held Ultraviolet Inspection Lamp BCI 90/2, March - April 1980.
Nonionizing radiation protection special study,
Nicholas P. Krial, and David H. Sliney. 20 Jun 80, 19p Rept no. USAEHA-25-42-0319-80

The Ardrox inspection light emits potentially hazardous levels of UV-A and UV-B radiation; however, considering its normal application where direct, intrabeam viewing does not occur, there is no actual hazard to the nonphotosensitive user. (Author)

AD-A087 039/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Effect of Infrared Laser Radiation on Biological Systems.
Final rept. Mar 72-May 73,
George W. Pratt, Jr. Jun 73, 14p
Contract DADA17-72-C-2101

A low power CO2 laser has been used to kill a spore preparation of Bacillus Subtilis. The CO2 laser has been found to be very effective in deactivating these spores. A 65 watt/sq cm beam reduced the dry live spore population by 3 orders of magnitude in 0.4 seconds as compared to a reduction by one order of magnitude after 60 seconds exposure (150 times as long) to pressurized steam at 130 C. A possible explanation of the high efficiency of laser sterilization may be deactivation by resonant absorption of infrared energy at 10.6 mu. Experiments discussing selected damage in proteins are presented. (Author)

AD-A087 105/3 PC **A04**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Laser Raman Spectroscopy of Ultraviolet-Induced Cataracts in Rabbits and Monkeys.
Final rept. Sep 77-Feb 79,
Dwaine M. Thomas, and Kenneth L. Schepler.
Dec 79, 56p Rept no. SAM-TR-79-40

The Raman spectra of normal rabbit and monkey lenses have been recorded over the range of 0-1/4000 cm. Spectral results indicate that protein conformation is predominantly beta-pleated sheet. Polarization measurements and assignments for most of the bands have been made; the spectral region for water indicates extensive hydrogen bonding. A nitrogen laser, operating at 337 nm, was used to produce cataracts in rabbit and monkey lenses; the Raman spectra of the cataractous lenses were also recorded. Spectral changes, observable in the water region, are correlated with a mechanism of ultraviolet cataractogenesis.

AD-A087 269/7 PC **A04**/MF **A01**
Duke Univ Medical Center Durham NC Dept of Ophthalmology
Research on Ganglion Cell Responses after Laser Exposure of the Retina.
Final rept. Jan 77-Dec 78,
Myron L. Wolbarsht. May 80, 51p SAM-TR-80-18
Contract F33615-77-C-0609

Electrophysiological recordings were made from retinal ganglion cells in the macula (including fovea) of several species of Macaque monkeys. After exposure to high-intensity argon or HeNe lasers both above and below the lesion level, the receptive fields lacked a peripheral portion. This was accompanied by a slight increase in the central portion of the receptive field. Some quite large receptive fields were found around the fovea, often extending through it. The large receptive fields could also extend through the site of a laser lesion. No unsymmetrical changes in the receptive field were seen, even in receptive fields adjacent to, or partially within, a laser lesion site. Histological examination did not show any changes in the retinal organization adjacent to laser lesion even where the ganglion cells had center-only receptive fields. (Author)

LIU-RAD-R-033 PC **A02**/MF **A01**
Linkoeping Univ. (Sweden). Institutionen foer Radiologi.
Vectorial and Plane Energy Fluences - Useful Concepts in Radiation Physics.
C. A. Carlsson. Jun 77, 20p
U.S. Sales Only.

The vectorial physical quantities describing the radiation field are defined in this report. The use of these quantities is rare in the radiation dosimetry literature since a knowledge of the directions of motion of the ionizing particle is often uninteresting when determining absorbed doses. However the plane energy fluence rate is a useful quantity in cases with plane irradiation geometries. The plane energy fluence rate is closely related to the vectorial energy fluence rate. The backscattering properties of a medium can be expressed in terms of either its albedo or its reflection-coefficient (backscatter-coefficient). These quantities are discussed in order to derive useful relations between the plane energy fluence and the energy fluence at points on an extended plane surface. Examples are also given of erroneous use of energy fluence instead of vectorial or plane energy fluence. The examples are taken from roentgen diagnostic examinations. To prevent further mistakes it could be valuable if the quantities of vectorial and plane fluences were introduced in textbooks in radiation dosimetry. Awaiting this, this report may hopefully be useful. (Atomindex citation 10:491310)

6S. Stress Physiology

AD-A087 144/2 PC **A03**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
The DCIEM 'On Line' Serial Choice Reaction Timer (SCRT),
P. L. White, B. H. Fowler, D. M. Sweeney, G. T. Chillcott, and G. R. Wright. Mar 80, 39p Rept no. DCIEM-80-R-17

An apparatus was developed to measure the psychomotor performance, namely, serial choice reaction time and movement time, of human subjects during exposure to various environmental stresses, such as, hypoxia and inert gas narcosis. It consists of a stimulus-response module (SRM) which is comprised of geometrically arranged sets of light omitting diodes (LEDs) and corresponding response buttons for extinguishing the LEDs as they are randomly lit. The apparatus is constructed in such a way that it permits visual stimulus intensity, the number of response alternatives and the average movement distance to be varied. A PDP 11/04 computer is used to control the apparatus and to record and analyze subjects' responses. (Author)

AD-A087 174/9 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Relation of Breathing Oxygen-Argon Gas Mixtures to Altitude Decompression Sickness.
Interim rept. Oct 77-Jan 79,
Julian P. Cooke, Kenneth G. Ikels, Jimmy D. Adams, and Richard L. Miller. 1980, 7p Rept no. SAM-TR-79-395
Pub. in Aviation, Space, and Environmental Medicine, v51 n6 p537-541 1980.

No abstract available.

6T. Toxicology

AD-A087 035/2 PC **A04**/MF **A01**
Army Medical Bioengineering Research and Development Lab Fort Detrick MD
A Short-Term Toxicity Screening Test Using Photobacteria -- A Feasibility Study.
Technical rept. Nov 78-Dec 79,
Ronald N. Shiotsuka, Andrew F. Hegyeli, Paul H. Gibbs, and Bruce A. Siggins. Jun 80, 64p Rept no. USAMBRDL-TR-8002

This report describes a feasibility study using photobacterium Beneckea harveyi as the biologic system to test for toxicity. More specifically, the bioluminescent activity was used to assess the bacterial response to toxic chemicals. The chemicals used in this study are 2,3-dinitrotoluene, 2,4-dinitrotoluene, 2,5-dinitrotoluene, 2,6-dinitrotoluene, 3,4-dinitrotoluene 2,3,6-trinitrotoluene, 2,4,6-trinitrotoluene, p-nitrobenzonitrile and m-nitrobenzonitrile. Three dose-response studies were conducted with each of the nine chemicals and an effective concentration which causes a 50% reduction in bioluminescence (EC50) was statistically computed. The mean of the three EC50 values were compared to the LD50 of rats and mice, the 96-hour LC50 for fathead minnows (Pimephales promelas), and the 48-hour EC50 for water flea (Daphnia magna). Of these comparisons, only the LD50 of male mice showed a fairly good degree of correspondence. It is concluded that reproducible dose-response curves can be obtained from the photobacterial test system and it is recommended that further testing be conducted to increase the number of compounds tested for further comparisons with other species. (Author)

AD-A087 236/6 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Topical Hazard Evaluation Program of Candidate Insect Repellents AI3-16734-(1,11,78)-Ga, AI3-37519, AI3-37521, AI3-37529a, AI3-37531a, and AI3-37532a US Department of Agriculture Proprietary Compounds.
Final rept. Jun 78-May 80,
Allen W. Singer. May 80, 8p USAEHA-75-51-0109-80, USAEHA-75-51-0111-80, USAEHA-75-51-0113-80, USAEHA-75-51-0151-80
Also available Rept. nos. USAEHA-75-51-0152-80, and USAEHA-75-51-0153-80.

insect repellent compound AI3-16734-(1, 11, 78)-Ga was tested for primary irritation by application to clipped dorsal skin and to the eyes of New Zealand White rabbits. Although it was only mildly irritating to the skin, eye applications resulted in rapid systemic absorption and sudden generalized convulsions in both rabbits used, with one of the rabbits dying overnight. This response was also seen with a chemically related candidate repellent AI3-37528a (rejected September 1979). Five additional homologs of AI3-16734-(1, 11, 78)-Ga currently await testing. With the concurrence of the originator, the Organic Synthesis Laboratory, Beltsville Research Center, Department of Agriculture, all six related compounds are recommended for withdrawal from future consideration as candidate insect repellents. These are: (1) AI3-16734(1,11,78)-Ga, (2) AI3-37519, (3) AI3-37521, (4) AI3-37529a, (5) AI3-37531a, and (6) AI3-37532a.

AD-A087 257/2 PC **A15**/MF **A01**
Michigan State Univ East Lansing Dept of Poultry Science
Toxicology Study of Diisopropyl Methylphosphonate and Dicyclopentadiene in Mallard Ducks, Bobwhite Quail and Mink.
Final rept. Apr 76-Jun 79,
R. J. Aulerich, T. H. Coleman, D. Polin, R. K. Ringer, and K. S. Howell. Jun 79, 345p
Contract DAMD17-76-C-6054

This study was conducted to determine the toxicity, and tissue residue accumulation, of diisopropyl methylphosphonate (DIMP) and dicyclopentadiene (DCPD) in wildlife. The toxicity was evaluated by acute (LD50), subacute (LC50) and chronic tests with Mallard ducks, Bobwhite quail, and mink. Tissue residue analyses for DIMP and DCPD were conducted with Mallard ducks and Bobwhite quail. Based on the results of the LD50 tests, DIMP was

only slightly toxic to the test animals. An LD50 of 1490, 1000, and 503 mg/kg of body weight was determined for the Mallard, Bobwhite, and mink, respectively. The birds fed the diets with radioactive DIMP had 14C residues averaging less than 1 ppm which declined to less than detection limits, averaging 0.04 ppm, in most tissues, by the 3rd day after withdrawal. All tissues but skin were clear of residue by day 5 off radioactive feed. Skin had 0.05-0.1 ppm at that time. In the dosing experiment, residues at the second hour were 5.1 to 756 ppm, depending upon tissue and species. The residues, however, decreased rapidly with a biological half-life of 12.7 hours. Most tissues were at, or below, detection limits in 48 hours and clear at 65 hours, based on the half-life value. DIMP was not concentrated in the adipose tissue of either the ducks or quail.

AD-A087 380/2 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Inhibition of Protein Synthesis in Intact Hela Cells by Shigella dysenterie 1 Toxin,
J. Edward Brown, Sara W. Rothman, and B. P. Doctor. 1980, 12p
Pub. in Infection and Immunity, v29 n1 p98-107 Jul 80.

No abstract available.

INIS-mf-4522 PC **A05**/MF **A01**
Sao Paulo Univ. (Brazil). Faculdade de Ciencias Farmaceuticas.
Effect of Soybean Derivatives (Glycine Max) on Thyroid of Rats. Use of Radioactive Iodine.
T. M. C. C. Filisetti. 1977, 84p
In Portuguese.Tese (M.Sc.).
U.S. Sales Only.

The effect of a Brazilian variety soybean and their commercial products on thyroid gland was studied. Soybean derivatives were tested in rats through acute experiments of 3 to 24 hrs and semichronic experiments of 16 to 29 days. The autoclaved extract administered after 6 to 24 hrs decreased the percentage of iodine (exp 131 I) uptake. Semichronic experiments show that the factor found in soybean provokes both an increase or a reduction in percentage of iodine (exp 131 I) uptake, depending on the period of action. (Atomindex citation 09:414574)

PB80-205602 PC **A05**/MF **A01**
Mount Sinai School of Medicine, New York.
A Survey of the General Population of Michigan for Health Effects of PBB (Polybrominated Biphenyl) Exposure.
Interim rept. 1 Feb-15 Sep 78,
Irving J. Selikoff, Henry A. Anderson, Harry Smith, and Ford Calhoun. 1978, 77p
Sponsored in part by Michigan Dept. of Public Health, Lansing.

The accidental contamination of Michigan dairy farm animal feed by the polybrominated biphenyl (PBB) compound 'Firemaster' in 1973-74 was followed by illness and death of many cattle which had consumed PBB-containing feed. Unfortunately, before the cause and dimensions of the problem were fully appreciated, contamination of milk, beef, pork, eggs and chicken occurred, and ingestion of these foodstuffs resulted in PBB exposure of those who ate these products. Farm families, accustomed to eating their own produce, were first and perhaps most heavily exposed. Commercially marketed products soon entered the Michigan food chain; and thus occurred the potential for wide dissemination of this halogenated hydrocarbon into the general population of the state of Michigan. The Michigan Department of Public Health (MDPH) and the Michigan State legislature determined it was necessary to investigate the extent of PBB-exposure to all Michigan state residents and whether any ill effects were associated with detectable quantities of PBB. The most feasible approach to the problem was to commission a survey of a statistically representative sample of the general population of the state. The project was proposed in three phases with responsibilities to be shared by three institutions under independent but related contracts with the MDPH.

PB80-205834 PC **A05**/MF **A01**
Minnesota Univ.-Duluth. Dept. of Biology.
Algal Bioassays with Leachates and Distillates from Western Coal,
David Z. Gerhart, Joseph E. Richter, Sidney J. Curran, and Thomas E. Robertson. May 80, 79p
EPA-600/3-80-051
Grant EPA-R-803932

The objective of this research was to assess the effects on freshwater algae of materials derived from coal storage piles. Coal leachates and distillates were prepared in the laboratory from low-sulfur Montana coal. Three types of algal bioassays were conducted: (1) A laboratory stream facility was constructed which supported periphyton communities of 50-80 species growing on artificial substrates. These communities generally showed stimulation of growth and some species composition changes in response to coal leachates. Coal distillates inhibited growth. Periphyton exposed to distillates accumulated aliphatic hydrocarbons. (2) Short-term laboratory bottle tests with test species of algae generally showed growth inhibition in response to leachates and distillates. When distillates were bubbled to remove volatile organic compounds, growth stimulation was observed. (3) Three in-situ experiments in a small lake were conducted with coal distillates. Increases in algal biomass and bacterial populations in distillate-treated enclosures were observed in each of these tests.

PB80-205867 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Entomology.
Toxicity, Interactions, and Metabolism of Formamidine Pesticides in Mammals,
R. M. Hollingworth, and G. K. W. Yim. May 80, 116p EPA-600/1-80-028
Contract EPA-R-803965

The overall goal of this research project was to investigate the mechanism(s) of acute toxicity of formamidine pesticides in mammals using chlordimeform (N'-(4-chloro-o-tolyl)-N,N-dimethylformamidine) and its metabolites as the primary model compounds. The role of biotransformations, particularly N-demethylation reactions, in generating potentially toxic metabolites was also studied. By comparing the effects of hepatic microsomal mixed function oxidase inducers and inhibitors administered in vivo on the toxicity, metabolism, and distribution of metabolites in mouse tissues, it was concluded that although N-demethylation products are innately more toxic than chlordimeform, they are also less stable, and the best correlation of toxicity was obtained with the total level of formamidines in the brain, rather than with the level of any individual metabolite. In a series of studies with dogs, rabbits, and cats, the cause of death was found to be cardiovascular collapse accompanied by respiratory arrest. Cardiovascular collapse resulted primarily from a peripheral local anesthetic-like effect of chlordimeform. Monoamine oxidase inhibition was not a major factor in lethality. Respiratory arrest was central in origin. Several other central effects of the formamidines were described, some of which may be local anesthetic actions, and a behavioral profile for chlordimeform poisoning in the rat was developed. The effectiveness of various drug treatments as potential therapeutic aids for formamidine intoxication were studied. Formamidines also have aspirin-like actions due to an inability to inhibit prostaglandin synthesis.

PB80-207376 PC **A05**/MF **A01**
American Public Health Association, Washington, DC.
Lung Cancer/Mortality in Proximity to a Pesticide Plant.
Final rept.,
Genevieve M. Matanoski, Emanuel Landau, James Tonascia, Christiana Lazar, and Elizabeth A. Elliott. Mar 80, 80p EPA-560/11-80-013
Contract EPA-68-01-3859
Prepared in cooperation with Johns Hopkins Univ., Baltimore, MD. School of Hygiene and Public Health.

This interim report covers a study of excess mortality from cancer in the population residing near a chemical plant in Baltimore which had produced insecticides for 75 years. Cancer deaths were examined for a five and nine year period surrounding census years to determine not only the absolute mortality but the changing trends. Four index census tracts including the one containing the plant were selected based on the requirement that at least 50 percent of the area lay within a three-quarter mile radius of the plant. Comparison tracts were selected based on matching the index tracts by age, sex, and socio-economic status. Employee deaths were subtracted. The lung cancer death rate on an age adjusted basis had been found to be significantly higher in the census tract containing the plant. It had been rising rapidly since the mid-sixties. A study of the validation of hospital records and the pathology of cancer cases indicates that the excess risk of lung cancer represents a real risk in mortality and is not the result of local diagnostic and certification practices. A corollary study of soil arsenic indicated highest levels in the tract with increased lung cancer mortality. The pattern of high soil levels appeared to be related to rail transport of the arsenical material. Further research is required to determine whether other factors may play a role in the excess of lung cancer.

PB80-208788 PC **A13**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Chemical Hazard Information Profiles (CHIPs).
Toxics Integration Information series, 1 Aug 76-20 Nov 79.
Apr 80, 296p EPA-560/11-80-011

This collection of 40 Chemical Hazard Information Profile (CHIP) reports was prepared by the Office of Pesticides and Toxic Substances (OPTS) between August 1, 1976, and November 20, 1979. Chemicals are chosen for CHIP preparation on the basis of information indicating potential for adverse health or environmental effects of significant exposure. The CHIP itself is a brief summary of readily available information concerning health and environmental effects and exposure potential of a chemical. Information gathering for a CHIP is generally limited to a search of secondary literature sources and is not intended to be exhaustive; however, in depth searches on specific topics may be done on a case-by-case basis. In general, no attempt is made to evaluate or validate information at this stage of assessment. Preparation of a CHIP is part of the first stage in the OPTS Chemical Risk Assessment Process. The purpose of the CHIP is to enable OPTS to make a tentative decision on an appropriate course of action for the subject chemical and to identify and characterize problems that may require more thorough investigation and evaluation.

PB80-209133 PC **A04**/MF **A01**
Cincinnati Univ., OH. Dept. of Environmental Health.
Potential Health Effects from Persistent Organics in Wastewater and Sludges Used for Land Application.
Final rept. 1978-Feb 80,
Vimala A. Majeti, and C. Scott Clark. May 80, 63p EPA-600/1-80-025
Grant EPA-R-805445-01

The potential health problems associated with the presence of persistent organic chemicals in wastewater and sludge, when applied to agricultural lands, are reviewed. The type and amounts of organic chemicals present in wastewater and sludge, their fate on land, and available control measures are discussed. The potential health effects of organic chemicals on workers/populations who come in contact with them during wastewater treatment, transportation, and/or application are considered. The review concludes that there is not sufficient information at present to assess the full extent of long-term health risks of exposure to organics in the wastewater treatment plants or at land application sites. Recommendations are made concerning guidelines and further research. Further research is recommended on the uptake of organic chemicals by food crops. Long-term follow-up is also recommended for populations who have had acute short-term exposure to organic chemicals from waste materials.

PB80-212665 PC **A07**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
2,4,5-T: Position Document 1.
15 Mar 79, 150p EPA/SPRD-80/76

The report is a preliminary risk assessment for T 2-4-5 herbicides. It gives a preliminary examination

of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

7.

CHEMISTRY

7A. Chemical Engineering

PATENT-4 162 298 Not available NTIS
Department of Energy, Washington, DC.
Method of Immobilizing Carbon Dioxide from Gas Streams.
Patent,
D. W. Holladay, and G. L. Haag. Filed 9 Aug 78, patented 24 Jul 79, 10p PAT-APPL-932 152
Supersedes PAT-APPL-932 152-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention comprises a method for rapidly and continuously immobilizing carbon dioxide contained in various industrial off-gas streams, the carbon dioxide being immobilized as dry, stable, and substantially water-insoluble particulates. Briefly, the method comprises passing the gas stream through a fixed or fluidized bed of hydrated barium hydroxide to remove and immobilize the carbon dioxide by converting the bed to barium carbonate. The method has several important advantages: it can be conducted effectively at ambient temperature; it provides a very rapid reaction rate over a wide range of carbon dioxide concentrations; it provides high decontamination factors; and it has a high capacity for carbon dioxide. The invention is especially well suited for the removal of radioactive carbon dioxide from off-gases generated by nuclear-fuel reprocessing facilities and nuclear power plants. (ERA citation 05:030286)

PATENT-4 196 183 Not available NTIS
Department of Energy, Washington, DC.
Process for Purifying Geothermal Steam.
Patent,
C. T. Li. Filed 24 Jan 79, patented 1 Apr 80, 6p PAT-APPL-6-005 942
Supersedes PAT-APPL-6-005 942.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Steam containing hydrogen sulfide is purified and sulfur recovered by passing the steam through a reactor packed with activated carbon in the presence of a stoichiometric amount of oxygen which oxidizes the hydrogen sulfide to elemental sulfur which is adsorbed on the bed. The carbon can be recycled after the sulfur has been recovered by vacuum distillation, inert gas entrainment of solvent extraction. The process is suitable for the purification of steam from geothermal sources which may also contain other noncondensable gases. (ERA citation 05:030571)

PB80-206238 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Energy and Entropy Fluxes in Coal Gasification and Liquefaction Processes.
Final rept.,
Hans Voigt. c1980, 28p RR-80-20

Coal conversion systems are rather complex, not only internally but also with respect to their exchanges with the environment, some use auxiliary energy, others yield by-products. Therefore, the evaluation of such systems is not a simple task and the comparison of very different systems--different in the nature of inputs and outputs--must not be reduced to a comparison of energy efficiencies. Moreover, because these studies cover a long time period it is necessary to estimate the potential development of related processes in order to determine the inputs required for producing substitute fuels. There are physical and chemical limitations to potential improvement. This paper outlines these constraints and provides means for the evaluation and comparison of different fuel synthesis processes, especially regarding methanol. The possibility of adding energy from nuclear or solar primary energy sources to such processes is discussed and the advantages are assessed. (Copyright (c) 1980 International Institute for Applied Systems Analysis.)

7B. Inorganic Chemistry

AD-A086 981/8 PC **A06**/MF **A01**
Rockwell International Canoga Park CA Rocketdyne Div
Research Studies in NF4(+) Salts.
Final technical rept. 1 Apr 77-31 Mar 80,
K. O. Christe. 23 May 80, 124p RI/RD80-157,
ARO-14394.10-C
Contract DAAG29-77-C-0007

This report describes the results of a 3-year program in basic research studies in NF4(+) chemistry. The mechanism of NF4(+) salt formation and decomposition was determined and the decomposition kinetics of NF4AsF6 and NF4BF4 were measured. The formation of NF3(+) salt intermediates, both in the formation and decomposition of NF4(+) salts, was established, and the NF3(+) radical cation was thoroughly characterized by ESR spectroscopy. Improved synthetic methods were developed for NF4SbF6 and its metathesis to other NF4(+) salts. A new method was developed for the synthesis of NF4(+) salts derived from polymeric Lewis acids which do not form HF soluble cesium salts. The following new NF4(+) salts were synthesized and thoroughly characterized: (NF4)2MnF6, NF4HF2, NF4UF5O, NF4CLO4 and NF4SO3F. In addition, the novel N2F3SnF5 and N2F3SbF6 salts, which are useful burning rate modifiers in solid propellant NF3-F2 gas generator formulations, were prepared and characterized. Unsuccessful attempts were made to prepare NF4NO3, NF4ClF4O, NF4BrF4O, NF4BrO4 and NF4(+) salts of several transition metal fluoride anions. Crystal structure determinations of NF4BF4 and NF4SbF6, and the measurement of thermodynamic data on NF4BF4, NF4PF6, NF4AsF6, and NF4SbF6 are in progress.

AD-A087 252/3 PC **A03**/MF **A01**
Virginia Univ Charlottesville Dept of Chemistry
Transition Metal-Promoted Oxidative Fusion with Carborane and Borane Anions. Synthesis of C4Bn (N = 8-11) Carborane Systems in the Presence of B5H8- or B3H8- Ions.
Technical rept.,
Narayan S. Hosmane, and Russell N. Grimes. Jul 80, 39p Rept no. TR-33
Contract N00014-75-C-0305

Simultaneous treatment of CoCl2 or FeCl2 with the (2,3-(CH3)2C2B4H5)- and (B5H8- ions in THF at room temperature gave mixed-ligand metallacarborane complexes. In the iron-borane-carborane reaction the order of addition of reagents is important; thus, treatment of FeCl2 initially with (B5H8)- followed latter by ((CH3)2C2B4H5)- gave species identified mass spectroscopically as ((CH3)2C2B5H5)2FeH2 and (CH3)4C4B10H10' neither of which was observed in the previously described 'simultaneous' reaction.

7C. Organic Chemistry

PATENT-4 125 728 Not available NTIS
Department of the Navy Washington DC
Method for Preparing 2,3,7,8-Tetraazaspiro(4,4)Nona-2,7-Diene.
Patent,
Arnold T. Nielson. Filed 1 Sep 77, patented 14 Nov 78, 5p AD-D007 394/0, PAT-APPL-829 761
Supersedes PAT-APPL-829 761-77, AD-D004 343.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Synthetic routes to 2,3,7,8-tetraazaspiro(4,4)nonane, its bispicrate salt, 2,3,7,8-tetraazaspiro(4,4)nona-2,7-diene, and 3,8-dicarbomethoxy: 2,3,7,8-tetraazaspiro(4,4)none-1,6-diene. The compounds are useful as high density fuels. (Author)

PATENT-4 173 002 Not available NTIS
Department of the Navy Washington DC
Method of Lasing with 7-Hydroxy-Coumarin-8-Methyleneiminobisacetic Acid and Metal Complexes Thereof.
Patent,
Dwight A. Fine, and Aaron N. Fletcher. Filed 20 Mar 78, patented 30 Oct 79, 2p AD-D007 410/4, PAT-APPL-888 122
Supersedes PAT-APPL-888 122-78, AD-D005 057.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for lasing comprising preparing an aqueous solution of a member selected from the group consisting of 7-hydroxy-coumarin-8-methyleneiminbisacetic acid and the Ca++, Sr++, Ba++ and Al+++ complexes thereof and subjecting the solution to the energy provided by a laser. (Author)

PATENT-4 200 753 Not available NTIS
Department of the Navy Washington DC
Water-Soluble Fluorescing and Lasing Dyes.
Patent,
Ronald A. Henry. Filed 17 Nov 78, patented 29 Apr 80, 5p AD-D007 383/3, PAT-APPL-961 578
Supersedes PAT-APPL-961 578-78, AD-D005 601.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Water soluble coumarin, and azacoumarin compounds are prepared by a four step method involving (1) the formation of the benzylaminophenol or benzylaminohydroxypyridine, (2) the formation of a coumarin or azacoumarin, (3) sulfonation of the coumarin or azacoumarin and (4) neutralization of the sulfonate with sodium bicarbonate. The compounds are useful as water-soluble lasing dyes.

7D. Physical Chemistry

AD-A086 889/3 PC **A02**/MF **A01**
Rockwell International Anaheim CA Electronics Research Center
Solid-State Anion Migration in the Anodic Oxidation of Lutetium Diphthalocyanine,
F. A. Pizzarello, and M. M. Nicholson. 13 Aug 79, 10p AFOSR-TR-80-0490
Contracts F49620-79-C-0104, F49620-77-C-0074
Pub. in Jnl. of Electronic Materials, v9 n2 p231-239 1980.

No abstract available.

AD-A086 904/0 PC **A02**/MF **A01**
Polytechnic Inst of New York Farmingdale Dept of Mechanical and Aerospace Engineering
Developments in Laser Based Diagnostic Techniques,
S. Lederman. 1980, 22p AFOSR-TR-80-0517
Contracts F49620-78-C-0020, N00014-75-C-1143
Pub. in Proceedings of the International Symposium on Shock Tubes and Waves (12th), p48-65 1980.

No abstract available.

AD-A086 918/0 PC A03/MF A01
Wisconsin Univ-Madison
Surface Defects and Thermodynamics of Chemisorbed Layers.
Technical rept.,
M. G. Lagally, T. -M. Lu, and D. G. Welkie. 14 Sep 79, 35p
Contract N00014-76-C-0727

Chemisorbed overlayers on single crystal surfaces can in many cases be considered as lattice gases. The general features of temperature-coverage phase diagrams resulting from attractive or repulsive adatom interactions in such systems are discussed in analogy with binary solid solutions. The effect of surface and overlayer defects on the determination of phase boundaries is considered. The use of low-energy electron diffraction (LEED) to study surface defects and overlayer phase diagrams is briefly summarized. (Author)

AD-A086 923/0 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
A High-Pressure Conductivity and Laser Raman Spectroscopic Study of Aqueous Orthophosphate Solutions at 25C,
W. A. Adams, Caroline M. Preston, and H. A. M. Chew. 9 Oct 78, 8p Rept no. DREO-789
Availability: Pub. in Jnl. of Chemical Physics, v70 n5 p2074-2080, 1 Mar 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 928/9 PC A02/MF A01
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Electron Spin Resonance of Polyacetylene and AsF5-Doped Polyacetylene,
I. B. Goldberg, H. R. Crowe, P. R. Newman, A. J. Heeger, and A. G. MacDiarmid. 6 Sep 78, 11p
Rept no. LRSM-TR-79-4
Contract N00014-75-C-0962
Pub. in Jnl. of Chemical Physics, v70 n3 p1132-1136, 1 Feb 79. Prepared in cooperation with Rockwell International, Thousand Oaks, CA. Science Center.

No abstract available.

AD-A086 976/8 PC A02/MF A01
California Univ Los Angeles Dept of Chemistry
Reactions and Relaxation of Vibrationally Excited Hydrogen.
Final rept.,
Jerome V. V. Kasper. 20 Jun 80, 7p AFOSR-TR-80-0541
Grant AFOSR-78-3612

One of the goals of this research was the measurement of H2(v equal 1) and H2(v equal 2) formed by the reaction of H with HI. The technique used is quantitative absorption spectroscopy on various absorption bands of H2 near 1100 angstroms in the vacuum ultraviolet. Preliminary calculations indicated that features due to HI in this region would be sufficiently weak under the desired operating conditions that quantitative spectroscopy of the transitions from the vibrationally excited H2 could be performed. This proved not to be the case. Pressures on the order of 10 to 100 millitorr of HI obscured the bands in this region. The signal/noise ratio of the original apparatus which employed sodium salicylate to down convert the vacuum ultraviolet photons to near uv-visible ones was inadequate to the task of unraveling the spectrum. Subsequent equipment improvements have reduced the source noise. The spectrometer and pressure gauge have been modified and interfaced to a digital computer. The analysis software determines the equivalent widths of the spectral features and converts these to pressures of H2 in specific (v, J) states. The flow system and reaction cell for the photolytic experiments proposed was constructed and awaits mating with the now operational laser. (Author)

AD-A087 024/6 PC A02/MF A01
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Organic Metals and Semiconductors: Polyacetylene, (CH)x, and Its Derivatives.
Technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 21 Oct 79, 12p Rept no. LRSM-TR-79-9
Contract N00014-75-C-0962

As can be seen from the illustrated Figure, which contains a list of conductivities of common substances, (CH)x is quite remarkable in that its conductivity can be readily modified to span an extraordinarily large range. Considering possible polyacetylene derivatives, replacement of some or all of the hydrogen atoms in (CH)x with organic or inorganic groups, copolymerization of acetylene with other acetylenes or olefins, and the use of different dopants should lead to the development of a large new class of conducting organic polymers with electrical properties that can be controlled over the full range from insulator to semiconductor to metal.

AD-A087 033/7 PC A04/MF A01
Rockwell International Anaheim CA Electronic Devices Div
GaAs Surface Effects.
Interim technical rept. 1 Jul 78-1 Jul 79,
G. Kinoshita, and Gordon G. Kuhlmann. Mar 80, 61p C79-1032/501, AFWAL-TR-80-1018
Contract F33615-78-C-1591

This report presents the results of the first six months of a program to investigate the passivation of GaAs surfaces using a native insulator. Ion implantation of phosphorus and subsequent oxidation of the surface was used to form the insulator. Post-implant annealing indicates that CVD SiO2 has somewhat better encapsulating properties than sputtered Si3N4. It was found that high-dose phosphorus implantation significantly reduces decomposition of the semiconductor surface under the SiO2 encapsulant during high-temperature annealing. Ion microprobe analysis of the implant profiles indicate that phosphorus diffusion is not significant during either high-temperature annealing or oxidation. Elemental depth profiles of oxide layers indicate phosphorus incorporation into the film in the region from the peak of the implant to the interface with the semiconductor. A lack of arsenic and phosphorus at the oxide surfaces indicates that this region may be composed primarily of Ga2O3.

AD-A087 034/5 PC A09/MF A01
Columbia Radiation Lab New York
Research Investigation Directed Toward Extending the Useful Range of the Electromagnetic Spectrum.
Progress rept. no. 30, 1 Apr 79-31 Mar 80,
George W. Flynn. 31 Mar 80, 186p
Contract DAAG29-79-C-0079, Grant DAAG29-80-C-0043
Sponsored in part by Grants AFOSR-79-0082, NSF-ENG76-16424, NSF-MPS75-04118.

Preliminary studies of spin relaxation of optically pumped sodium in xenon gas have shown that Van der Waals NaXe cause a substantial part of the relaxation. The electron-nuclear spin exchange cross section between Na and Xe129 has been measured to be less than ten to the -19th power/sq cm. Calculations and preliminary experiments have shown that radiofrequency spectroscopic studies of the anomalously long lived 5D state of cesium are possible. Further studies of dense alkali vapors have shown that all of the alkali vapors sodium, potassium, rubidium and cesium, have absorption bands in the spectral region between 1 micron and 2.5 micron. The possibility that some of these bands might be useful for the construction of infrared excimer lasers is being investigated.

AD-A087 062/6 PC A02/MF A01
Southampton Univ (England) Dept of Chemistry
Experimental Determination of Initial Vibrational and Rotational Energy Distributions from the Reaction D + F2.
Final rept. 1 Feb 79-31 Jan 80,
Neville Jonathan. 21 Feb 80, 13p EOARD-TR-80-12
Grant AFOSR-79-0067

Preparatory experiments and construction of apparatus leading up to attempts to obtain the initial vibrational and rotational energy distribution of deuterium fluoride produced in the gas phase reaction D + F2 yields DF + F are described. Discrepancies between results obtained with the present apparatus and that of other workers are discussed and resolved. (Author)

AD-A087 107/9 PC A04/MF A01
Naval Surface Weapons Center Silver Spring MD
Electronic Stopping Power Calculations for all Heavy Ions at Low Velocity in All Elements.
Final rept.,
J. G. Brennan, and D. J. Land. 17 Mar 80, 66p
Rept no. NSWC/TR-80-89

Values of the electronic stopping power for projectiles from carbon to uranium in elemental targets from hydrogen through the transuranic elements at the Bohr velocity, are presented in sets of tables. The stopping powers were calculated within a modified Firsov model. An algorithm for determining the stopping power from v=0 to v=3 to 4 v sub o is discussed. The stopping powers, as obtained from this algorithm, are compared with an extensive collection of experimental data. The results are presented in a series of graphs.

AD-A087 114/5 PC A15/MF A01
Center for Naval Analyses Alexandria VA Operations Evaluation Group
Limit Cycle Solutions of Reaction-Diffusion Equations.
Professional paper,
Davis Cope. Jun 80, 331p Rept no. OEG-PP-287
Doctoral thesis.

Contents: Introduction to Reaction-Diffusion Equations; Stability of Limit Cycle Solutions of Reaction-Diffusion Equations; An Analytic Construction for Winfree's Isochrons; Perturbation of the Limit Cycle Solution to Reaction-Diffusion Equations; Numerical Solutions of Reaction-Diffusion Equations; Traveling Waves in Reaction-Diffusion Systems.

AD-A087 133/5 PC A02/MF A01
Wisconsin Univ-Milwaukee Dept of Chemistry
International Summer Institute in Surface Science (4th), (ISISS 1979).
Final rept. 1 Apr 79-31 Mar 80,
Ralf Vanselow. 9 Jul 80, 19p
Grant N00014-79-G-0035

At the Fourth International Summer Institute in Surface Science, tutorial review talks were presented on gas-solid and gas-liquid interfaces.

AD-A087 155/8 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Enthalpies of Dilution of Phosphate Solutions at 30C,
Frank J. Millero, Wayne C. Duer, Elizabeth Shepard, and Peter V. Chetirkin. 1 May 78, 14p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Jnl. of Solution Chemistry, v7 n12 p877-889 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 166/5 PC A02/MF A01
Pittsburgh Univ PA Dept of Physics and Astronomy
Cross-Section for the Reaction O(-)+O2 Yields O2(-)+O at Relative Kinetic Energies from Threshold to 3 eV.
S. L. Lin, and J. N. Bardsley. 20 Aug 79, 12p
Contract N00014-76-C-0098
Availability: Pub. in International Jnl. of Mass Spectrometry and Ion Physics, v34 p113-124 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 168/1 Not available NTIS
Naval Biosciences Lab Oakland CA
Reactivity of Dioxygen and Nitric Oxide with Manganese Complexes Containing Hexadentate Ligands,
W. M. Coleman, and L. T. Taylor. 25 May 79, 5p
Availability: Pub. in Jnl. of Inorganic and Nuclear Chemistry, V42 p683-687 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 179/8 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
Speed of Sound in NaCl, MgCl2, Na2SO4, and MgSO4 Aqueous Solutions as Functions of Concentration, Temperature, and Pressure,
Chen-Tung Chen, Lee-Sea Chen, and Frank J. Millero. 11 Jan 78, 6p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Jnl. of Acoustical Society of America, v63 n6 p1795-1800 Jun 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 182/2 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
Comment on 'A New Density Relation for Pure and Saline Water',
B. Gebhart, and J. C. Mollendorf. 4 May 77, 3p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Deep-Sea Research, v25 p499-501 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 184/8 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Apparent Molal Volume and Adiabatic Compressibility of Some Organic Solutes in Water at 25 C,
Antonio Lo Surdo, Charles Shin, and Frank J. Millero. 27 Oct 77, 5p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Jnl. of Chemical and Engineering Data, v23 n3 p197-201 Jul 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 202/8 PC **A10**/MF **A01**
Frank J Seiler Research Lab United States Air Force Academy CO
Chemiluminescent Reactions of Selenium and Tellurium with Fluorine.
Technical rept.,
William G. Thorpe. Apr 80, 218p Rept no. FJSRL-TR-80-0010

The Group VI elements, selenium and tellurium, are found to react with fluorine emitting a broad spectral chemiluminescence. The chemiluminescence is characteristic of that emitted by a diatomic molecule. The proposed emitting species are SeF and TeF. Selenium reacts with fluorine with a weak chemiluminescence in the visible between 3800 A and 8900 A. Identical spectra are obtained regardless of whether the source of selenium is the elemental vapor or hydrogen selenide. In the hydrogen selenide/fluoride reaction, vibrationally excited HF is produced with the identified bands: (4,0), (5,1), (6,2), and (3,0) super-imposed on the SeF chemiluminescence.

AD-A087 206/9 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Catalytic Oxidation of Carbon Monoxide at High Humidity and Low Temperature.
Interim rept.,
J. K. Musick, and F. W. Williams. 10 Jun 80, 20p NRL-8397, AD-E000 475
Continuation of Rept. no. NRL-8353, AD-A077 323.

Two catalysts (hopcalite and palladium) were tested for efficiency in promoting oxidation of carbon monoxide (CO). The catalysts were tested using air at 21 000 per h to the minus 1 space velocity, 50% relative humidity, and various temperatures. The air was contaminated with approximately 100 ppm each of methane, dichlorofluoromethane (R-12), and dichlorotetrafluoroethane (R-114) in addition to approximately 5000 ppm of CO. Hopcalite was further tested under similar conditions except that the air was at 100% relative humidity. There is little difference in the efficiencies of hopcalite and palladium catalyst for oxidizing CO at 57 to 62 C; both are low. At 119 to 122 C, the palladium is more efficient than hopcalite. The simultaneous presence of three other contaminants decreased the efficiency of both hopcalite and palladium for oxidizing CO. With the hopcalite preheated to about 119 C, the heat of reaction is not sufficient to maintain the oxidation of CO under the conditions tested. The minimum temperature at which hopcalite and palladium catalysts will completely oxidize CO under the conditions tested is in the 70 to 100 C range.

AD-A087 209/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Proton Relaxation in 1, 3, 5-Triamino-2, 4, 6-Trinitrobenzene (TATB).
Final rept. 1 Apr-31 Sep 79,
A. N. Garroway, and H. A. Resing. 16 Jun 80, 25p NRL-MR-4250, AD-E000 477
Contract DOE-DE-AP-03-79-SF-10186

The compound 1, 3, 5 triamino-2, 4, 6-trinitrobenzene (TATB) is simple yet intractable; it is virtually insoluble and sublimes with decomposition at elevated temperature. It is, however, extremely attractive in its role as an insensitive high explosive. The origin of this insensitivity is not presently known. Compressed powders of pure TATB and also bonded TATB materials are found to expand irreversibly when the temperature is cycled; it is suggested (1) that this hysteresis stems from stresses induced by the anisotropic volume expansion of TATB. The mechanism for the large c-axis thermal expansion coefficient, over eight times that of graphite, is not understood. As a step towards identifying the character of the molecular motions which may relate to mechanical insensitivity and thermal expansion, we have performed a series of proton relaxation studies in (solid) TATB over the temperature range of approximately -80 to 240 C. In brief, we find that there is very little (detectable) molecular motion below about 150 C.

AD-A087 210/1 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Electron Ionization Cross Sections in the Distorted-Wave Approximation.
Memorandum rept.,
M. Blaha, and J. Davis. 18 Jun 80, 52p NRL-MR-4245, AD-E000 478

Eight different modifications (A1-A8) of the distorted-wave approximation for the calculation of electron ionization cross sections are introduced and results are compared with other theoretical methods and experiment. Non-exchange approximations (A1-A4) are characterized by different orthogonal properties of wave functions and by different choices of asymptotic charges for the ejected electron. Results of these approximations are compared for H, He, He(+), Li(+), and Mg(+). The best approximation (A4) is then used for more complex atomic systems such as Li, C(+3), C(+), N(+), O(+), O, Ne(+), Na(+), and K(+). A4 generally agrees better with experiment than the Born or Coulomb-Born approximation. Exchange approximations (A5-A8) are characterized by different choices of asymptotic charges in the exchange amplitude. These approximations have been tested on hydrogen and although a slight improvement over the non-exchange approximations has been obtained in the case of A5, the difference does not appear to be too significant.

AD-A087 234/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
High-Temperature, High-Resolution Measurements of CO2 in the Region of 2200 to 2400 cm-1.
Environmental research papers,
Hajime Sakai, Mark Esplin, William Dalton, and George A. Vanasse. 27 Feb 80, 21p Rept nos. AFGL-TR-80-0068, AFGL-ERP-698

The CO2 vibrational-rotational transition in the 4.3-micrometers region (2200 to 2400/cm) was observed at an elevated temperature of 600 K. The technique of Fourier spectroscopy was used to observe the spectrum with a resolution of 0.006/cm. The identified lines are expressed in terms of the molecular constants determined through the least-square-error fitting method.

AD-A087 278/8 PC **A04**/MF **A01**
IRT Corp San Diego CA
Investigation of Electron Attachment in Polyatomic Molecules.
Final rept. 1 Apr 77-31 Mar 80,
Jerry T. Dowell. 30 May 80, 61p IRT-8164-004, AFOSR-TR-80-0549
Contract F49620-77-C-0071

Electron attachment to polyatomic molecules was studied using molecular beams of variable temperature crossed with an electron of high energy resolution. Species investigated include sulfur hexafluoride, molybdenum hexafluoride, and tungsten oxide polymers. New results were obtained in sulfur hexafluoride demonstrating importance of internal energy for the dissociative attachment in molybdenum hexafluoride. Tungsten oxide vapor exhibits both monomer and dimer negative ion formation near zero energy, apparently from dissociative attachment to the trimer. (Author)

AD-A087 293/7 PC **A04**/MF **A01**
State Univ of New York At Buffalo Dept of Chemistry
Electrochemical and Spectroscopic Studies of 9, 10-Anthraquinone in a Room Temperature Molten Salt.
Technical rept.,
Graham T. Cheek, and R. A. Osteryoung. Jul 80, 55p Rept no. TR-2
Contracts N00014-79-C-0682, F49620-79-C-0142

The electrochemical and spectroscopic properties of 9,10-anthraquinone (AQ) in the low-temperature AlCl3:n-butylpyridinium chloride (BuPyCl) molten salt system have been studied as a function of melt acidity. Infrared spectroscopic data indicate that AQ exists in the uncomplexed state in the basic melt (0.8 AlCl3:1.0 BuPyCl). The electrochemical behavior in this region involves a single-process two-electron reduction (with slow electron transfer) of AQ to its dianion, the reduction mechanism probably proceeding by an ECE pathway. Oxidation of the dianion back to AQ occurs at a potential considerably positive (600mV) of the potential for AQ reduction, thus indicating some interaction of the dianion with the melt. The complexation of AQ by Al2Cl7 - in the acidic melt (1.2 AlCl3:1.0 BuPyCl produces AQ.2AlCl3 as indicated both by infrared spectroscopy and chemical analysis. This complexation results in a shift in potential for the reduction process compared to the corresponding potential for AQ reduction in the basic melt of +1.4V. The reduction of AQ.2AlCl3 also involves a single-wave two-electron process (with faster electron transfer than in the basic melt), thought to proceed by a disproportionation mechanism.

AD-A087 309/1 MF **A01**
Texas Univ At Austin Dept of Chemistry
An Electron Spectroscopic Investigation of the Interaction of Methanol with Polycrystalline Aluminum.
Technical rept. 1 Jan-21 Dec 80,
J. W. Rogers, Jr., R. L. Hance, and J. M. White. 15 Jun 80, 20p Rept no. TR-14
Contract N00014-75-C-0922
Availability: Microfiche copies only.

X-ray and ultraviolet photoelectron spectroscopic results are reported for the interaction of CH3OH with clean polycrystalline Al in the temperature range 110-500 K. Methanol is molecularly chemisorbed at low exposure and low temperature (110 K) followed by condensation at higher exposure. The multilayers desorb beginning near 170 K and the chemisorbed layer is converted into a surface methoxide. Room temperature adsorption also leads to formation of the methoxide species which is stable to approximately 500 K, at which point it decomposes evolving CH4 and leaves the surface oxidized. (Author)

AD-A087 344/8 PC **A02**/MF **A01**
Oakland Univ Rochester MI Dept of Chemistry
Electrochemical Generation of the Naked Metal Anionic Clusters, Sn sub 9-x(Pb sub x)-4 (x=0 to 9).
Technical rept.,
B. Stanley Pons, David J. Santure, R. Craig Taylor, and Ralph W. Rudolph. 15 Jun 80, 8p Rept no. TR-1
Contract N00014-79-C-0664

Tin and lead electrodes reduce in the presence of electrodeposited sodium in ethylenediamine to

give highly charged naked metal anionic clusters. (Author)

AD-A087 345/5 PC **A02**/MF **A01**
Oakland Univ Rochester MI Dept of Chemistry
Approximation of Chronopotentiometric Responses by Orthogonal Collocation.
Technical rept.,
B. Stanley Pons. 15 Jun 80, 22p Rept no. TR-2
Contract N00014-79-C-0664

High accuracy simulations of chronopotentiometric responses are demonstrated for several electrochemical mechanisms. Derivation of the discretized equations for simple electron transfer and EC mechanisms are given and others are tabulated. (Author)

AD-A087 363/8 MF **A01**
Texas Univ At Austin Dept of Chemistry
Photoassisted Water-Gas Shift Reaction over Platinized TiO2 Catalysts.
Technical rept. no. 15, 1 Jan-31 Dec 80,
Shinri Sato, and John M. White. 15 Jul 80, 17p
Contract N00014-75-C-0922
Availability: Microfiche copies only.

The reaction of gas phase water with CO (water-gas shift reaction) over platinized, powdered TiO2 is found to be catalytic under UV illumination. The reaction kinetics have been studied at temperatures from 0 to 60 C. At 25 C, the reaction is zero order both in CO and water when p sub CO > or = 0.3 torr and p sub H2O > or = 5 torr and the activation energy is 7.5 kcal/mole. The wavelength dependence of the reaction rate shows a cut-off near, but slightly below, the band gap of titanium oxide. The quantum efficiency of the reaction is about 0.5% at 25 C. (Author)

AD-A087 384/4 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
Molal Volume and Adiabatic Compressibility of Aqueous Phosphate Solutions at 25 C,
Antonio Lo Surdo, Kerstin Bernstrom, Carl-Ake Jonsson, and Frank J. Millero. 20 Nov 78, 9p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Jnl. of Physical Chemistry, v83 n10 p1255-1262 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

BARC-979 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Vibration-Rotation Energy Levels of UF sub 6.
V. A. Job, and V. B. Kartha. 1978, 9p
U.S. Sales Only.

In order to understand and interpret the observed spectra completely, all the possible vibrational and rotational energy levels of UF sub 6 , their symmetry species and populations at various temperatures in the range 200-400deg K have been calculated and a summary of the results is presented. (Atomindex citation 10:481029)

CONF-800626-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Resonantly Enhanced Multiphoton Ionization and Third-Harmonic Generation in Krypton and Xenon.
J. C. Miller, and R. N. Compton. 1980, 4p
Contract W-7405-ENG-26
International conference on vacuum ultraviolet radiation physics, Charlottesville, VA, USA, 2 Jun 1980.

Multiphoton ionization (MPI) and third-harmonic generation (THG) in gaseous krypton and xenon have been studied using multiple laser photons resonant with numerous atomic energy levels of the target gas. The MPI and THG were studied concurrently in a high-pressure ionization cell with a vacuum ultraviolet (Vuv) radiation detector. Mass-resolved MPI and photoelectron spectra were recorded at low pressure (< 10 exp -4 torr) using the time-of-flight (TOF) mass spectrometer and double focusing spherical energy analyzer. (ERA citation 05:026493)

DOE/ER/04971-2 PC **A03**/MF **A01**
New York Univ., Bronx. Dept. of Physics.
Energy-Related Atomic and Molecular Structure and Scattering Studies. Annual Progress Report, July 1, 1979-June 30, 1980.
B. Bederson. Mar 80, 39p
Contract ER-78-S-02-4971

The basic goals of this program concern the experimental determination of properties of atoms and simple molecules that are important in a wide range of energy-related processes. In particular we have initiated measurements of polarizabilities of highly polar molecules and dimers, and of a number of atoms distributed through the periodic table, and, of the scattering of low energy electrons by highly polar molecules. For this latter series of measurements an entirely new apparatus has been designed and its external components have been completed. A new electron optics assembly has also been designed and is currently under construction. Details of all these projects are presented; analysis and data of the polarizability measurements are also given. (ERA citation 05:026495)

DOE/ER/10444-1 PC **A02**/MF **A01**
Boston Univ., MA.
Infrared Absorption Spectrum of Free Carriers in Polar Semiconductors. Progress Report, July 1, 1979-June 30, 1980.
B. Jensen. Feb 80, 11p
Contract AC02-79ER10444

The Drude Zener theory of the absorption of high frequency radiation by free carriers (inverse bremsstrahlung) has been extended into the quantum region (h-bar omega > k sub 0 T) in terms of a frequency dependent relaxation time which predicts the dc mobility in the quasiclassical limit. Numerical calculations of the frequency and concentration dependent electron scattering rate have been completed for InP, InAs, Ga sub 0 sub 47 In sub 0 sub 53 As, and previous results for GaAs extended to high carrier concentrations. When starting from a quantum statistical theory, the fact that n/sub q/oh-bar omega implies k sub 0 T at low frequencies can be used to prevent the divergence of the coulomb scattering rate without inclusion of a screening radius. A result containing no adjustable parameters is found which predicts a mobility for uncompensated samples that decreases strongly at high concentrations. This has been observed in GaAs, and is not accounted for by the usual dc calculation which assumes h-bar omega = 0 and a screening parameter. Calculated results for GaAs are in good agreement with experimental measurements of the mobility which are found to be independent of a wide variety of conditions of material preparation. This indicates that disagreement with previous theoretical calculations was not due to compensation. Calculations for ZnSe and further investigation of the modification of the optical constants by the presence of an intense laser field and by a static magnetic field are currently planned. (ERA citation 05:026482)

INIS-mf-5224 PC **A04**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Physik.
Bremsstrahlung of La and its Dependence on Electron Energy.
F. Riehle. 6 May 77, 61p
In German.Thesis.
U.S. Sales Only.

Measurements of La-bremsstrahlung isocromates with high resolution for quantum energies between 135 eV and 1867 eV are presented and discussed. In the whole energy range investigated, the isocromate structure, identified with the 4f band of La, is placed 5,45 +- 10,1 eV above the Fermi level. This is in contradiction with a calculation of Gloetzel, which predicts the 4f band maximum about 3eV above the Fermi level. This discrepancy is explained in the present work by the fact that the La electronic density of states depends on the occupation number of the states. The bremsstrahlung isocromate has to be considered as a direct copy of the La ion density of states, consisting of the La-atom and the additional primary electron. Resonance like intensity modulations of the x-ray radiation, resulting from transitions of the primary electron in f-like final states, are observed in an analysis of the La-bremsstrahlung isochromate energy dependence. For transitions of the primary electron in d-like final states, no resonances have been found. The energy dependence of the scattering probability in f-like final states can be explained by a model which assumes the final state as composed by a continuum state and a discrete state. (Atomindex citation 10:481148)

ORO-3027-53 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
Excitation and Ionization of Ions by Electron Impact. Final Report, September 1, 1969-March 31, 1980.
R. K. Feeney, D. W. Hughes, and J. W. Hooper.
31 Mar 80, 23p
Contract EY-76-S-05-3027

This report presents a brief summary of the technical accomplishments of a research program active from September 1, 1969, through March 31, 1980. All of the work was related to the atomic collision process of importance in magnetic confinement fusion. A chronological tabulation of technical accomplishments, a list of publications, and a summary of progress in the measurement of electron impact ionization cross sections are given. (ERA citation 05:026498)

PATENT-4 190 704 Not available NTIS
Department of the Navy Washington DC
Protected Calcium Anode.
Patent,
Melvin H. Miles, Aaron N. Fletcher, and Dwight A. Fine. Filed 5 Feb 79, patented 26 Feb 80, 7p
AD-D007 386/6, PAT-APPL-6-008 997
Supersedes PAT-APPL-6-008 997, AD-D005 825.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A calcium electrode for an electrochemical cell has an electrolyte consisting of molten nitrates and up to 10 mole percent halides. (Author)

PB80-205347 PC **A03**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Engineering and Applied Science.
Laser-Raman Point Monitoring of CH4 Vapor in the LNG Storage Field.
Final rept. 1 Jan-31 Dec 79,
Richard K. Chang, and Robert E. Benner. Dec 79, 39p GRI-79/0050
Contract GRI-5014-363-0146

Using an eight-component hydrocarbon gas which simulated the contents of natural gas, the authors have demonstrated that unique Raman signatures for each species exist and real-time Raman monitoring of each species is possible by detection with an optical multichannel analyzer which can measure simultaneously a large portion of the Raman spectrum. Furthermore, they have investigated the feasibility of using optical fibers to guide the laser radiation to a remote probe site and to collect/guide the Raman scattered radiation back to the detection system.

PB80-205636 Not available NTIS
Environmental Sciences Research Lab., Research Triangle Park, NC.
Energy Dispersive X-Ray Fluorescence Analysis of Dust Collected Using a Vertical Elutriator Cotton Dust Sampler.
Journal article,
R. E. Fornes, R. D. Gilbert, S. P. Hersh, and T. G. Dzubay. 1980, 10p EPA-600/J-80-028
Prepared in cooperation with North Carolina State Univ. at Raleigh. School of Textiles.
Pub. in Textile Research Journal, v50 n5 p297-304 May 80.

X-ray fluorescence (XRF) spectroscopy has been used to analyze trace element concentrations in cotton dusts collected on verticle elutriator filter media. Twenty-three samples collected from ten bales of cotton processed in a model card room have been analyzed. The major elements in the dust detected by the XRF technique are Al, Si, P, S, Cl, K, Ca, Mn, Fe, Cu, Zn and Ba. The XRF method has been shown to give reproducible results and may be used to show differences between airborne dusts in a card room. Similar analyses are reported of cotton dusts collected on areal sample.

PB80-205859 PC **A03**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC.
Ambient Air Monitoring for Benzene. 24-Hour Integrated Sampling in Six Cities.
Final rept. 1 Jun 77-1 Apr 80,
Barry E. Martin, Thomas Clark, Joseph Bumgarner, and Gary F. Evans. May 80, 41p
EPA-600/4-80-027

This monitoring program was initiated to assess the population exposure to ambient levels of benzene in conjunction with the announcement of benzene as a hazardous material. The program was conducted during the summer and fall of 1977. Average benzene concentrations of 5, 18, and 19 microgram/cu in, respectively, were measured in the widely separated cities of Dallas, Chicago, and Los Angeles. The precision of these data is estimated to be + or - 26 percent of the measured values. The improvement of benzine monitoring and analysis technology was an important secondary objective of this program. However, further research is needed to identify a more favorable collection medium than the Tenex that was used in this study.

PB80-205891 Not available NTIS
National Bureau of Standards, Wasington, DC.
The Reaction of F Atoms with CO in an Argon Matrix. Vibrational and Electronic Spectra of FCO.
Final rept.,
M. E. Jacox. 1980, 15p
Pub. in Jnl. of Molecular Spectroscopy 80, p257-271 1980.

Upon codeposition at 14K of an AR:CO sample with an Ar:NF3 sample that had been passed through a low-power microwave discharge in an Al2O2 tube, very prominent infrared absorptions of FCO and F2CO were observed. Overtone bands of FCO were identified at 2032 and 3690/cm, and their assignment was confirmed by both carbon-13 and oxygen-18 isotopic substitution. Further data were also obtained on the vibrational fundamentals of isotopically substituted F2CO. A six-constant valence force potential has been derived for FCO using a least-squares force constant adjustment to the isotopic data and assuming a recently calculated structure. The photodissociation of FCO into F + CO was assuming a recently calculated structure. The photodissociation of FCO into F + CO was observed with a threshold near 2800 A. The assignment of two overlapping electronic transitions of FCO between 3400 and 2300 A is discussed.

PB80-205925 Not available NTIS
National Bureau of Standards, Washington, DC.
Bond Directions in Absorbed Molecules Determined Using High Resolution Electron Energy Loss Spectroscopy (EELS): Acetylene and Ethylene on Tungsten(100).
Final rept.,
J. C. Hamilton, N. Swanson, B. J. Waclawski, and R. J. Celotta. 1980, 1p
Pub. in Proceedings on the Physical Elctronics Conf., Ithaca, NY, pE7, 16-18 Jun 80.

The authors have used high resolution electron energy loss spectroscopy in both specular and non-specular directions to identify the vibrational modes of acetylene and ethylene on the tungsten (100) surface. At low coverages several of the vibrational modes were detectable only in the non-specular direction. Analysis of relative intensities of the specular and non-specular losses allows determination of the orientation of molecular dipole moments and thus of bond directions in the adsorbed species, for both acetylene and ethylene initial adsorption was found to be dissociative.

PB80-205933 Not available NTIS
National Bureau of Standards, Washington, DC.
Logarithmic Terms in the Softness Expansion of Dilute Gas Transport Properties.
Final rept.,
R. F. Kayser, Jr. 15 May 80, 11p
Pub. in Jnl. of Chemical Physics 72, n10 p5458-5468, 15 May 80.

The author considers the dilute gas coefficients of viscosity and thermal conductivity for the inverse power potential.

PB80-205941 Not available NTIS
National Bureau of Standards, Washington, DC.
Quantum Beats Observed in Photoionization.
Final rept.,
G. Leuchs, S. J. Smith, and E. Khawaja. Dec 79, 4p
Pub. in Optics Communications 31, p313-316 Dec 79.

Quantum beats of the hyperfine levels of the 3 doublet P(3/2) state of sodium have been observed in photoionization. The atoms are ionized stepwise with two pulsed lasers. The photoelectron angular distribution, measured as a function of the delay between the two laser pulses, exhibits a periodic variation due to the quantum beat effect. The hyperfine splitting of the intermediate state estimated from these measurements is in good agreement with literature values.

PB80-205958 Not available NTIS
National Bureau of Standards, Washington, DC.
The Determination of Electron Collision Cross Sections from Swarm Data.
Final rept.,
A. V. Phelps. 1980, 10p
Pub. in Proceedings on the Int. Seminar on the Swarm Experiments in Atomic Collision Research, Tikky Univ., Tokyo, Japan, p23-32, 6-7 Sep 79.

Electron collision cross sections have been determined from swarm data, such as mobility and diffusion coefficients, since the early studies of Townsend and coworkers. Work through the 1940's provided (a) still useful measurements of electron transport coefficients and approximate momentum transfer cross sections in a wide variety of gases: (b) the recognition of the unique ability of swarm measurements to provide cross sections for very low energy processes such as rotational excitation; and (c) rigorously formulated, lowest order solutions to the Boltzmann equation for electrons in gases in a uniform electric field. The application of high speed computers and the development of techniques for precision measurement of electron transport coefficients in the 1960's made possible the serious determination of electron collision cross sections from swarm data.

PB80-208259 Not avaliable NTIS
National Bureau of Standards, Washington, DC.
Phosphate Ion with Three 'Symmetric' Hydrogen Bonds: The Structure of Ca2(NH4)H7(PO4)4.2H2O.
Final rept.,
S. Takagi, M. Mathew, and W. E. Brown. 1980, 6p
Pub. in Acta Cryst. B36, p766-771 1980.

The structure was refined by the method of least squares to R(F)=0.048; R(w)(F)=0.050 for 904 reflections with ((F)(0)). The structure contains (CaH2PO4)(+) chains held together by Ca...O bonds to form corrugated Ca-P(2)O4 sheets analogous to those found in CA(H2PO4)2. H2O and several other calcium phosphates.

PB80-208275 Not available NTIS
National Bureau of Standards, Washington, DC.
Core-Level Satellite Structure in Photoemission Spectra of Transition Metals.
Final rept.,
J. Tersoff, L. M. Faklicov, and D. R. Penn. 1979, 3p
Pub. in Solid State Communications 32, p1045-1047 1979.

A theory of the satellite structure of the core-level photoemission spectrum of transition metals is presented. It is applied to the doublet p(3/2) level of metallic nickel. The calculation is carried out for both the paramagnetic and ferromagnetic states and is based on two scattering parameters, one intraband and one interband. Agreement with experiment is very good.

7E. Radio and Radiation Chemistry

PAT-APPL-6-042 163 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Method for Producing Rapid pH Changes.
Patent Application,
J. H. Clark, A. J. Campillo, S. L. Shapiro, and K. R. Winn. Filed 24 May 79, 30p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of initiating a rapid pH change in a solution comprises irradiating the solution with an intense flux of electromagnetic radiation of a frequency which produces a substantial pK change to a compound in solution. To optimize the resulting pH change, the compound being irradiated in solution should have an excited state lifetime substantially longer than the time required to establish an excited state acid-base equilibrium in the solution. Desired pH changes can be accomplished in nanoseconds or less by means of picosecond pulses of laser radiation. (ERA citation 05:031001)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A087 196/2 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution MA
A Database for Zooplankton Net Tow Data.
Technical rept.,
Mary M. Hunt, and Peter H. Wiebe. Jun 80, 73p
Rept no. WHOI-80-28
Contract N00014-79-C-0071

This report describes the design and implementation of a database to store zooplankton net tow data and the applications programming done to update and access the database using the Sigma 7 Extended Database Management System. The database contains information about each tow (cruise name, tow number, type of tow, year, month, day, longitude, latitude, area of tow, day-night code); each sample (depth code; minimum and maximum depth; minimum, maximum and average values of temperature, salinity, oxygen, light and chlorophyll; total biomass, aliquot size, and volume of water filtered); each species (family, genus, species names, and catch per 1000 cu m). Information can be retrieved by user-written applications programs or with the Sigma 7 Interactive Database Processor, which can either print a report of the retrieved data or store it in a file for further processing. As presently formulated, the database can store up to 500 tows or samples, 10 families, 100 genera, 500 species and 50,000 catch records. (Author)

PB80-209596 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Marine Ecosystems Analysis Program Office.
Epibenthic Zooplankton Assemblages at Selected Sites Along the Strait of Juan de Fuca.
Technical memo.,
Charles A. Simenstad, William J. Kinney, and Bruce S. Miller. Jan 80, 80p NOAA-TM-ERL-MESA-46, NOAA-8006113
Also pub. as Washington Univ., Seattle. Fisheries Research Inst. Completion report FRI-US-8002.

A survey of epibenthic zooplankton characterizing shallow sublittoral habitats along the Strait of Juan de Fuca was conducted in August 1978 in conjunction with coincident nearshore fish collections at the same sites. Approximately 235 taxa of invertebrate epifauna were identified in the 28 samples from 17 microhabitats distributed over the seven

sampling sites; amphipods, polychaetes, gastropods, isopods, and copepods dominated the taxonomic composition. Sandy substrates with dense eelgrass beds, located at Port Williams and Beckett Point, had the highest diversity, density, and standing crop of any of the 17 microhabitats sampled; more exposed, wave swept sites such as Twin Rivers and Kydaka Beach typically had the least developed epifauna community.

PB80-212079 PC **A02**
Scripps Institution of Oceanography, La Jolla, CA.
Some Metabolites of the Marine Sponges 'Smenospongia aurea' and 'Smenospongia ('Polyfibrospongia) echina',
Peter Djura, Donald B. Stierle, Brian Sullivan, D. John Faulkner, and Edward Arnold. 14 Nov 79, 9p
Contract NOAA-04-6-158-44110
Pub. in Jnl. of Organic Chemistry, v45 p1435-1441 1980. Prepared in cooperation with Cornell Univ., Ithaca, NY. Dept. of Chemistry.

The antimicrobial metabolite of the marine sponge Smenospongia aurea was found to be 5-bromo-N,N-di-methyltryptamine (4). The same sponge also contained aureol (6), and unusual sesquiterpene-hydroquinone derivative. A second sample of S. aurea contained 8-epichromazonarol (20) and the indole 27. Two samples of Smenospongia echina were examined and were shown to contain the antimicrobial constituent.

PB80-212103 PC **A02**
New York Sea Grant Inst., Albany.
Pathogenesis of Infectious Pancreatic Necrosis in Atlantic Salmon ('Salmo salar'),
Robert N. Swanson, and James H. Gillespie. 31 Jan 79, 8p NYSG-RR-80-21, NOAA-80062405
Grant NOAA-04-7-158-44009
Pub. in Canadian Jnl. of Fisheries and Aquatic Sciences, v36 n5 p587-591 1979.

Atlantic salmon (Salmo salar) fry and yearling were found to undergo an active but subclinical infection following exposure to infectious pancreatic necrosis (IPN) virus. Eight-week-old Atlantic salmon fry were fed live virus and the mortality and virus concentration in these fry were recorded over a period of 78 d following exposure. Yearling Atlantic salmon were inoculated intraperitoneally with IPN virus and the concentration of virus in the pancreas-interstine, kidneys, spleen, liver, and gonads of inoculated fish was determined over a period of 74 d following inoculation. Virus first appeared in the fry 3 d postinoculation (DPI) and virus titers reached a peak by 8 DPI. Low levels of virus persisted in fry sampled 78 DPI. Virus first appeared in the pancreas-intestine of Atlantic salmon 12 h postinoculation (HPI) and was detected in the kidneys, liver, and spleen by 72HPI. Peak virus titers were reached in the pancreas-intestine by 72 HPI. Both the pancreas-intestine and kidneys continued to support viral growth frequently and appeared to be important reservoirs of virus. At no time was virus isolated from the gonads of inoculated yearling. Histological examination of yearlings revealed degenerative change in the pancreatic acinar tissue and in some cases focal necrosis in the liver. No histological abnormalities were found in IPN-infected fry.

8B. Cartography

AD-A087 370/3 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Terrain Analyst Synthesizer Station.
Technical rept.,
Gunther Schwarz. Jun 80, 28p Rept no. ETL-0231
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report describes the Terrain Analyst Synthesizer Station built under contract for USAETL. Tests were performed to determined the characteristics and adherence to the specifications set forth in the Purchase Description. (Author)

AD-A087 443/8 PC **A02**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Errors in Automatic Pass Point Mensuration Using Digital Techniques.
Technical rept.,
Michael A. Crombie. Jun 80, 22p Rept no. ETL-0232

A technique for automatically measuring pass points from digital stereo images is evaluated. Numerical estimates of x-parallax and y-parallax for a specific stereo pair of images is presented as a function of terrain relief. (Author)

8C. Dynamic Oceanography

AD-A086 926/3 PC **A02**/MF **A01**
Sibley School of Mechanical and Aerospace Engineering Ithaca NY
Some Fundamental Aspects of Turbulence with Implications in Geophysical Flows,
John L. Lumley. 1980, 19p
Contract N00014-78-C-0088, Grant NSF-ATM77-22903
Pub. in Marine Turbulence, p175-192 1980.

No abstract available.

AD-A087 096/4 PC **A04**/MF **A01**
University of South Florida Tampa Dept of Geology
A Dynamic Process Model for the Beach-Inlet Transition Zone.
Final rept. 1 Jan 77-30 Jun 80,
Richard A. Davis, Jr., and William T. Fox. May 80, 68p Rept no. TR-3
Contract N00014-77-C-0151
Prepared in cooperation with Williams Coll., Williamstown, MA.

Monitoring of tide and wave generated processes and adjacent to Matanzas Inlet, Florida was conducted during the summer of 1978. Data collected include weather parameters, wave and longshore current measurements, tidal currents and morphology of the inlet and adjacent beach and nearshore area. Measurements were made in a time-series mode in order to provide desired input for anticipated modeling of inlet mouth dynamics. Related concurrent projects included drogue studies of tidal currents, sediment transport, bedforms and sediment texture in the inlet. Weather conditions during the study period were typical of summer conditions on the east coast of Florida. Interactions of tidal inlet processes with open coast processes are significant but restricted to only a few hundred meters of coast adjacent to the inlet. Longshore currents act alternately as a reinforcement and as a hindrance to flow as tides flood and ebb. During flood tides flow on the upcurrent side of the inlet is reinforced and the downcurrent side is hindered. Ebb currents produce the opposite effect on the longshore currents. Beyond the terminal lobe of the ebb tidal delta there is little effect of tidal currents on coastal processes. Inlet morphology is an extremely important influence on tidal processes. During flood conditions flow is controlled by channels until shoals are submerged at which time flow is determined primarily by overall inlet shape.

AD-A087 261/4 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
A Guide for Estimating Longshore Transport Rate Using Four SPM Methods.
Coastal engineering technical aid rept.,
Philip Vitale. Apr 80, 19p Rept no. CERC-CETA-80-6

This report is a guide for computing longshore transport rate. Step-by-step procedures are presented as a guide through an analysis of the available data to the appropriate choice of one or more of the four Shore Protection Manual methods of estimating the longshore transport rate. Each of the four method is explained with appropriate references or examples. (Author)

AD-A087 383/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Earth and Planetary Sciences
Evidence for a Continuous Spectrum of Equatorial Waves in the Indian Ocean,
Charles C. Eriksen. 20 Mar 79, 21p
Contracts N00014-80-C-0273, N00014-75-C-0291
Pub. in Jnl. of Geophysical Research, v85 nC6 p3285-3303, 20 Jun 80. Prepared in cooperation with Woods Hole Oceanographic Institution, MA. under Contract N00014-76-C-0197.

No abstract available.

8G. Geology and Mineralogy

AD-A086 975/0 PC **A02**/MF **A01**
Delaware Univ Newark Dept of Geology
A Geological Reconnaissance of the Coast of Anatolia.
Final rept.,
John C. Kraft. 23 Jan 80, 20p
Contract N00014-77-C-0334

The Anatolian subcontinent between the Black Sea, the Aegean Sea, and the Mediterranean Sea, is comprised of shorelines of ancient blocks of highly variable geology, mostly cliff-like (some cliffs undergoing rapid erosion, and some very slow erosion in terms of long term geologic time) with the cliff coast areas interspersed with depositional areas. Much has been written about the geology of the coasts of the Anatolian massif. However, the majority of the geologists that have treated this subject have dealt with the rocks of the long term geologic record. Most geologists have concerned themselves with studies of the ancient rocks (those not undergoing active change in the short term, less than 100 year period time frame). The majority of the studies appear to be tectonically oriented. The Anatolian massif is but one of a major group of highly mountainous tectonic blocks that have undergone formation over the Tertiary Period of geologic time (past 50-60 million years) in the Mediterranean area.

AD-A087 163/2 Not available NTIS
Massachusetts Inst of Tech Cambridge Dept of Earth and Planetary Sciences
Angular, Oriented Microtubes in Metamorphic Plagioclase,
Steven B. Shirey, Gene Simmons, and Elaine R. Padovani. 5 Jul 79, 5p
Contract N00014-76-C-0478
Availability: Pub. in Geology, v8 p240-244 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

NUREG/CR-1501 PC **A03**/MF **A01**
Vanderbilt Univ., Nashville, TN.
Monoclinal Structure and Shallow Faulting of the Reelfoot Scarp as Estimated from Drill Holes with Variable Spacings.
Technical rept.,
R. G. Stearns. Jul 80, 47p

The Reelfoot scarp is an east-facing slope on the Mississippi River alluvial plain. It descends eastward about 20 feet across a distance of about 600 feet. The scarp is mainly a monocline. However, a small fault occurs at the foot of the slope, along which there was about 3 feet of graben collapse which subsequently (maybe soon after 1812) filled in with soil washed down the adjacent monoclinal slope. The monoclinal structure was clearly shown by six drill holes spaced about 100 feet apart. A fault was indicated by these same holes, but a fault was not demonstrated by drilling until holes were drilled closer together than 10 feet.

PB80-209588 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Marine Ecosystems Analysis Program Office.
Observations and Measurements during the Monitoring of Deep Ocean Manganese Nodule Mining Tests in the North Pacific, March-May 1978.
Technical memo.,
R. E. Burns, B. H. Erickson, J. W. Lavelle, and E. Ozturgut. Apr 80, 69p NOAA-TM-ERL-MESA-47, NOAA-80061114

The objectives of the current phase of the project are to refine and modify predictive capabilities

through the analysis of data acquired by monitorning tests of prototype mining systems. Although neither the volume nor the duration of the pilot-mining tests was directly comparable to proposed full-scale commercial mining, many of the data collected support the basic assessment for commercial mining. In the surface discharge, total particulate concentrations were much higher than ambient and formed the principle element of mining-related impact to the surface waters. Initial mixing of the surface discharge into the ambient surface was expected to lower concentrations of measured elements of the discharge. The dispersion of the discharged particulates was monitored for as long as a surface plume could be detected. The short duration of the pilot-mining tests hampered planned investigations of short-term effects of the surface plume on the biota. Results of those experiments indicate a small and short duration effect on diminishing primary production within the plume. A before/after sampling of benthic faunal populations was made to assess initial impact of the mining on the benthos. Complete analysis is incomplete, but significant differences are not obvious in preliminary analysis.

PB80-813587 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Remote Sensing Applied to Geology. 1977-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1977-Jul 80,
Gerald F. Zollars. Aug 80, 94p
Supersedes NTIS/PS-79/0822. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns aspects of remote sensing as applied to geology and resource exploration. Included are articles concerning LANDSAT images, satellite-borne photography, aerial photography, and radar techniques being used to conduct geological surveys. Articles concerning photomapping and photo interpretation techniques relating to resource exploration are stressed. (This updated bibliography contains 393 citations, 178 of which are new entries to the previous edition.)

8H. Hydrology and Limnology

AD-A087 262/2 PC **A05**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
The Effect of Structures and Lake Level on Bluff and Shore Erosion in Berrien County, Michigan, 1970-1974.
Miscellaneous rept.,
William A. Birkemeier. Apr 80, 77p Rept no. CERC-MR-80-2

Rates of bluff recession and shoreline change along five 1.6-kilometer beaches located within Berrien County, Michigan, between 1970 and 1974 were measured by use of aerial photos. Annual measurements were made at 30.5-meter intervals, except for two adjacent reaches where biannual measurements were made. The overall average rate of recession for the five reaches was 3.8 meters per year. Average recession rate varied from 2.4 meters per year for a reach with low foredunes to 4.5 meters per year along a reach with a high sandy bluff. The greatest amount of recession resulted from a significant storm occurring 16 to 18 March 1973. Simple regression analysis of the data from both lake level and storm parameters identified storms as the primary cause of recession. However, the data set was too small and at such a unique point in the long-term lake level cycle (the crest of a rising peak) to quantify the effect of lake level. The effect of a 579-meter-long seawall constructed during the study is discussed; the volume of material eroded downdrift of the wall nearly equaled the amount of material removed from the sediment supply by the seawall. The procedures used in analyzing the air photos and their accuracy are described in an Appendix. Guidance is also given for determining the number of measurement points needed per distance along the shore depending on the desired accuracy of the bluff recession rates. (Author)

PB80-203268 PC **A02**
Michigan Univ., Ann Arbor. Dept. of Atmospheric and Oceanic Science.
A Factor Analysis of Elemental Associations in the Surface Microlayer of Lake Michigan and Its Fluvial Inputs,
James E. Mackin, Robert M. Owen, and Philip A. Meyers. cMar 80, 10p MICHU-SG-80-314, NOAA-80060503
Pub. in Jnl. of Geophysical Research, v85 nC3 p1563-1569, 20 Mar 80.

Elemental concentrations in surface microlayer and subsurface water samples from Lake Michigan and from its major fluvial sources were subjected to separate R mode factor analyses to define the geochemical phases and mechanisms which influence the composition of the surface microlayer. The associations revealed by these analyses indicate that the composition of fluvial microlayers is controlled by localized factors related to the geology of individual drainage basins, while open lake microlayers are influenced by broad scale physiochemical interactions. Depletions of both dissolved and particulate phase constituents in fluvial microlayers are attributed to upward diffusion of ions in sediment pore fluids and resuspension of bottom sediments.

PB80-207004 PC **A21**/MF **A01**
Geological Survey, Champaign, IL. Water Resources Div.
Water Resources Data for Illinois, Water Year 1979. Volume 1. Illinois except Illinois River Basin.
Annual rept. 1 Oct 78-30 Sep 79.
May 80, 500p USGS/WRD/HD-80/036, USGS-WDR-IL-79-1
See also Volume 1 dated Apr 79, PB-296 416.

Water resources data for the 1979 water year for Illinois consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground-water wells. This volume contains records for water discharge at 86 gaging stations; stage only at 2 gaging stations; stage and contents at 3 lakes and reservoirs; stage only at 2 lakes stations; and water quality at 112 gaging stations and 29 wells. Also included are data for 39 crest-stage partial-record stations.

PB80-207517 PC **A06**/MF **A01**
Massachusetts Univ., Amherst. Water Resources Research Center.
Post-Flood Recovery and Hazard Mitigation: Lessons from the Massachusetts Coast, February, 1978,
Rutherford H. Platt, and George M. McMullen.
May 80, 111p PUB-115, W80-06156, OWRT-A-119-MASS(1)
Contract DI-14-34-0001-9023

Responsibility for response to flood disasters has historically evolved from reliance on private, local and state efforts to a predominantly federal role. The federal government now expends billions of dollars annually for flood protection, emergency relief and long-term recovery. U.S. flood policy has emerged in three stages: (1) the Structural Era; (2) Unified Floodplain Management; and (3) Post-Flood Mitigation. Stage 3 represents an integrated response to floodplain management, utilizing structural and nonstructural controls, and focusing on the prevention of repetitive losses. The Great Blizzard and Coastal Flooding of February 1978 was one of the most devastating natural disasters to strike New England in modern times. Although damage assessments vary widely, over 25,000 homes were affected and over 300 destroyed in Massachusetts.

PB80-208556 PC **A23**/MF **A01**
Geological Survey, Lansing, MI. Water Resources Div.
Water Resources Data for Michigan, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
May 80, 537p USGS/WRD/HD-80/041, USGS-WDR-MI-79-1
See also report for Water Year 1978, PB80-117013.

Water resources data for the 1979 water year for Michigan consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water temperature of ground water. This report contains discharge records for 175 gaging stations; stage only records for 1 gaging station; stage and contents for 5 lakes and reservoirs; water quality for 62 continuous record stations; and water levels for 46 observation wells. Also included are 94 crest-stage partial-record stations and 45 low-flow partial-record stations.

PB80-212137 PC **A13**/MF **A01**
Geological Survey, Cheyenne, WY. Water Resources Div.
Water Resources Data for Wyoming, Water Year 1979. Volume 2. Green River Basin, Bear River Basin, and Snake River Basin.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Jun 80, 293p USGS/WRD/HD-80/050, USGS-WDR-WY-79-2
See also Volume 2 for Water Year 1978, PB80-177587.

Water resources data for the 1979 water year for Wyoming consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of wells. Volume 2 of this report contains discharge records for 62 gaging stations; stage and contents for 5 lakes and reservoirs; water quality for 39 gaging stations and 30 ungaged stations; and water levels for 8 observation wells. Also included are 25 crest-stage partial-record stations.

8I. Mining Engineering

PAT-APPL-6-061 149 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Caliper and Contour Tool.
Patent Application,
C. F. Fink. Filed 26 Jul 79, 9p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The disclosure relates to a tool for borehole logging comprising a plurality of extendable caliper arms to determine borehole contour. (ERA citation 05:030560)

PAT-APPL-6-067 856 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Induction Logging Device.
Patent Application,
A. R. Koelle, and J. A. Landt. Filed 20 Aug 79, 21p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An instrument is disclosed for mapping vertical conductive fractures in a resistive bedrock, magnetically inducing eddy currents by a pair of vertically oriented, mutually perpendicular, coplanar coils. The eddy currents drive magnetic fields which are picked up by a second, similar pair of coils. (ERA citation 05:030559)

PB80-204472 PC **A08**/MF **A01**
NUS Corp., Rockville, MD. Energy Systems Div.
Hazardous Surface Openings to Abandoned Underground Mines, Black Hills National Forest. Volume I: Appendixes A and B.
Open file rept. (Final) 29 May 79-1 Sep 79,
L. A. Stinnett, M. R. Lawton, and W. F. Jennings. 28 Sep 79, 171p BUMINES-OFR-74(1)-80
Contract J0295011
See also Volume 2, PB80-204480.
Also available in set of 3 reports PC A08, PB80-204464.

This study was conducted to: (1) examine a representative sample of surface openings to abandoned and inactive underground mines in the Black Hills; (2) to identify those openings of the sample that are a public hazard; (3) to design low cost protection to eliminate the hazard; (4) to ana-

ices laws and regulations pertaining to associated hazard elimination and jurisdictional and enforcement problems. Volume I contains the text and appendixes A and B.

PB80-204571 PC A06/MF A01
Skelly and Loy, Harrisburg, PA.
Topsoil Rock Removal Technology.
Open file rept. (Final) 1 Oct 78-30 Sep 79,
Walter W. Kaufman, Dale N. Reynolds, and John J. Noll. 31 Oct 79, 106p BUMINES-OFR-73-80
Contract J0285023

This report summarizes a study conducted to determine the state-of-the-art of various rock removal systems and their capabilities. The objective of the study was to determine if currently manufactured equipment can adequately accomplish rock removal in surface mine reclamation applications. Evaluations of State reclamation regulations, with regard to top-soil rock content, were made to determine the rock removal requirements. The major categories of equipment studied are rock pickers and rock rakes. The impact of rock removal implementation on the reclamation operations is discussed in detail.

PB80-205016 PC A06/MF A01
Illinois State Office of Lieutenant Governor, Springfield.
Program Review and Planning Document of the Abandoned Mine Lands Reclamation Council.
7 Mar 78, 115p

A partial listing of contents includes: History of coal development in Illinois; History of surface-mining reclamation laws in Illinois; The Abandoned Mined Lands Reclamation Act; Surface Mining Control and Reclamation Act of 1977; Survey of abandoned mined lands in Illinois; Abandoned mined land reclamation goal; Reclamation priorities; Plan development work assignments and responsibilities; Development of a planning and budgeting system.

PB80-207368 PC A07/MF A01
Foster-Miller Associates, Inc., Waltham, MA.
Design, Fabrication and Demonstration of an Inert Gas Generator. Volume II. Operations and Maintenance Manual.
Open file rept. 27 Jun 75-20 Feb 79,
Steven K. Ruggieri, and John T. Dieckmann. Jan 80, 150p BUMINES-OFR-72-80
Contract H0155053
See also report dated Apr 79, PB80-145881.

This report describes the operation and maintenance of a mobile inert gas generator for use in a remote sealing system for fighting underground coal mine fires. Seals are emplaced in mine passageways between the fire zone and the rest of the mine isolating the fire zone. The seals consist of fly ash that has been pneumatically conveyed by inert gas through a borehole connecting the surface and the passageway. Inert gas is used as the fly ash seal transport medium (instead of fresh air) since the introduction of large volumes of fresh air in the vicinity of the fire zone would be undesirable. The inert gas generator has been performance tested and operated in the field for approximately 200 hours. The system is currently available for fighting any future underground coal mine fires.

PB80-208614 PC A06/MF A01
Southwest Research Inst., San Antonio, TX.
Development of a Deep-Penetrating Borehole Geophysical Technique for Predicting Hazards Ahead of Coal Mining.
Final technical rept. 4 Jun 75-5 Jul 78,
Sidney A. Suhler, Thomas E. Owen, Jackie E. Hipp, and Wendell R. Peters. 5 Jul 80, 124p
BUMINES-OFR-77-80
Contract DI-H0252033

A field operable, breadboard model, borehole radar was developed to detect hazardous geological anomalies in and above a coal seam in advance of mining. A 4-inch-diameter downhole probe was fabricated and tested in several environments. The radar transmitter was also employed in a cross-hole or through-transmission mode to determine natural geotechnical and manufactured conditions between boreholes. Sensitivity to underground conditions in both modes of operation were indicated.

8J. Physical Oceanography

AD-A086 925/5 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Physical Chemistry of Baltic Sea Waters,
F. J. Millero. 10 Aug 77, 47p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Thalassia Jugoslavica, v14 n1/2 p1-46 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 930/5 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Equation of State of Seawater Determined from Sound Speeds,
Chen-Tung Chen, and Frank J. Millero. 3 Jan 78, 37p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Jnl. of Marine Research, v36 n4 p657-691 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 937/0 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
Effects of Pressure and Temperature on Activity Coefficients,
Frank J. Millero. 1977, 89p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Activity Coefficients in Electrolyte Solutions, p63-151 n.d. (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 952/9 PC A12/MF A01
Woods Hole Oceanographic Institution MA
Bottom Currents and Abyssal Sedimentation Processes South of Iceland.
Doctoral thesis,
Alexander Noble Shor. Jun 80, 251p Rept no. WHOI-80-30
Contract N00014-74-C-0262, Grant NSF-OCE76-81491

An investigation was carried out to observe the geologic effects of steady bottom currents on sediments of East Katla Ridge on the southern insular rise of Iceland. Near-bottom southwest to west-flowing currents exceeded 20 cm/sec for two weeks over a 25-kilometer wide section of the ridge flank between approximately 1400 and 1800 meters water depth; maximum density and minimum temperature were observed at 1800 meters. Total transport of Iceland-Scotland Overflow Water was calculated to be 5.0 x 10 to the sixth power cu m/sec. Suspended sediment transport is approximately 0.4 x 10 to the sixth power grams/sec, with a net deposition of 10 to 15 cm/1000 years estimated from the flux difference in and out of the station array. Sediment distribution patterns indicate that the current axis, where flow exceeds approximately 15 cm/sec, is a site of erosion and winnowing (sand layer formation) while the current margin is a site of rapid accumulation (from observed Holocene rates of 25 to 35 cm per 1000 yr to estimated rates of greater than 100 cm/1000 yr based on 3.5 kHz echosounder records). Holocene silty turbidites are locally thick in a submarine channel; sandy turbidites and current-winnowed 'sandy contourites' are present in the axis of the major submarine canyon.

AD-A087 141/8 PC A02/MF A01
Lamont-Doherty Geological Observatory Palisades NY
The Fram I Expedition,
Journal article,
Kenneth Hunkins, G. Leonard Johnson, Yngve Kristoffersen, and Andreas Heiberg. 27 Jun 80, 6p Rept no. LDGO-2931
Contract N00014-76-C-0004
Pub. in EOS, v60 p1043-1044 1979.

No abstract available.

AD-A087 178/0 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Thermodynamics of the Carbonate System in Seawater,
Frank J. Millero. 6 Mar 79, 11p
Contract N00014-75-C-0173, Grant NSF-OCE77-28546
Availability: Pub. in Geochimica et Cosmochimica Acta, v43 p1651-1661 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 180/6 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Density of North Pacific Ocean Waters,
Frank J. Millero, Donald Forsht, Dana Means, Joris Gieskes, and Kern E. Kenyon. 27 Jul 77, 6p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Prepared in cooperation with Scripps Institution of Oceanography, La Jolla, CA., Grant NSF-OCE76-02322.
Availability: Pub. in Jnl. of Geophysical Research, v83 nC5 p2359-2364, 20 May 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 181/4 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miami FL
The Densities of Mediterranean Sea Waters,
Frank J. Millero, Dana Means, and Carolyn Miller. 21 Sep 77, 7p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Availability: Pub. in Deep-Sea Research, v25 p563-569 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 304/2 PC A06/MF A01
Pacific-Sierra Research Corp Santa Monica CA
Evaluation of Standard Ocean Candidates.
Final technical rept. 1 Mar-30 Nov 79,
J. G. Colborn, S. C. Daubin, Jr., E. Hashimoto, and F. J. Ryan. Mar 80, 110p Rept no. PSR-922
Contract N00014-79-C-0310

This report evaluates eight candidate models (AUTO-OCEAN, GDEM, ICAPS, ODSI, GFDL, HYDAT, SIMAS) for Standard Ocean--a system to provide oceanographic and acoustic data in 1 deg x 1 deg oceanic squares, formatted for NORDA's numerical acoustic models and usable by nonspecialists. Meeting or exceeding most criteria were AUTO-OCEAN (outputs seasonal, RSVP-retrieved, extended sound-speed profiles in northern hemisphere 5 deg x 5 deg squares, as well as bathymetric, wave height, and bottom class data; rapid, inexpensive, and operational, but resolution still too coarse); and GDEM (not yet operational, but will provide northern hemisphere temperature surface to 400 m, salinity surface to 800 m, and sound-speed surface to bottom data on a 30 minute x 30 minute grid; output generally agrees with observations, but sometimes falls outside range of observed data, shows peculiar deep seasonal shifts, or misrepresents primary and secondary sound channels). (Author)

AD-A087 377/8 PC A02/MF A01
Naval Postgraduate School Monterey CA
A Numerical Case Study of the Development of Large-Scale Thermal Anomalies in the Central North Pacific Ocean,
Robert L. Haney. 14 Aug 79, 18p
Pub. in Jnl. of Physical Oceanography, v10 n4 p541-556 Apr 80.

No abstract available.

AD-A087 387/7 Not available NTIS
Rosenstiel School of Marine and Atmospheric Science Miamai FL

Gradual Increase of Oceanic CO2,
Chen-Tung Chen, and Frank J. Millero. 14 Sep 78, 3p
Contract N00014-75-C-0173
Availability: Pub. in Nature, v277 n5693 p205-206, 18 Jan 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 394/3 PC **A04**/MF **A01**
Pacific-Sierra Research Corp Santa Monica CA
Recent Standard Ocean Evaluation Results.
Technical progress rept. 30 Nov 79-1 May 80,
S. C. Daubin, Jr. Jun 80, 55p PSR-1015, SEAS-80-037
Contract N00014-79-C-0310

This report evaluates recent changes in NAVOCEANO's Generalized Digital Environmental Model. GDEM is the prime candidate for Standard Ocean--a system for retrieving oceanographic and acoustic data in 1 deg x 1 deg oceanic squares, formatted for NORDA's numerical acoustic models and usable by nonspecialists. Eighteen recent GDEM (Mod 1) sound speed (SS) profiles for various locations and seasons in the North Pacific are compared with typical real SS profiles selected by NOSC as well as previously reported GDEM (Mod 0) results. Mod 1 is better able than Mod 0 to match the typical real profiles at most locations. Mod 1 values now lie within the envelope of observed data and show decreased deep seasonal shifts. Further, the mean typical-minus-GDEM SS differences and standard deviations improve in Mod 1. However, Mod 1 still has difficulty representing secondary sound channels accurately and, in areas of high variability or few observations, occasionally shows a decreased matching ability. (Author)

AD-301 990/8 MF **A01**
Rhode Island Univ Kingston Narragansett Marine Lab
A Direct Measurement of Sound Velocities in Narragansett Bay Sediments
Technical rept. no. 4,
frank t. dietz, charles v. mulholland, and william b. birch. Jun 58, 10p Rept no. r58 4
Contract nonr39604
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

PB80-204506 PC **A05**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
The National Sea Grant Program: A Review. A Report for the Secretary of Commerce by the National Advisory Committee on Oceans and Atmosphere, November 3, 1976.
3 Nov 76, 84p NACOA-5

A year-long inquiry had led NACOA to conclude that Sea Grant plays an important role in the national effort to develop and conserve our marine resources. Sea Grant, as it has developed during its first 10 years, had been responsive to its legislative charter, and has contributed significantly to the Nation's marine effort. A continuing need for the kind of service it provides is foreseen and it is strongly recommended that the program be continued. Ways in which Sea Grant could be improved and its ability to contribute to the overall national interest enhanced are identified. The Sea Grant Act should be amended to permit other agencies to transfer funds to Sea Grant to support activities which they require and which the Sea Grant system is suited to provide, or to provide a separate appropriation for the purpose of supporting activities initiated at the Federal level, in response to national and international needs.

8K. Seismology

NUREG/CR-1569 PC **A05**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Geology and Geophysics.
Seismicity and Tectonic Relationships for Upper Great Lakes Precambrian Shield Province.
Final rept. 1976-79,
Harold M. Mooney, and Matt Walton. Jul 80, 93p
Contract NRC-04-76-289
Prepared in cooperation with Minnesota Geological Survey, St. Paul.

This is a final report comprising a three year study of the seismicity of Minnesota including the procurement and installation of a six station seismorgraph system. This system was deployed in a microearthquake monitoring array. An earth model was developed based on signals from mine blasts and regular earthquake bulletins were published. Descriptions of the model, methodologies, and three significant earthquakes are given.

8L. Snow, Ice, and Permafrost

AD-A087 032/9 PC **A12**/MF **A01**
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Radar Backscatter Study of Sea Ice.
Technical rept.,
R. G. Onstott, George J. Dome, Clifford V. Delker, Javed S. Patel, and R. K. Moore. Feb 80, 272p Rept no. CRINC/RSL-TR-331-14
Contract N00014-76-C-1105

The ability to use radar to discriminate ice types has been investigated. Radar backscatter measurements were made of shorefast sea ice near Point Barrow, Alaska in May 1977 and April 1978, with a surface-based FM-CW scatterometer that swept from 1-2 GHz and from 8.5-17.5 GHz. The 1-2 GHz measurements showed that thick first-year and multiyear sea ice cannot be distinguished at 10 deg-70 deg incidence angles, but that undeformed sea ice can be discriminated from pressure-ridged thick first-year sea ice and lake ice. Results also indicate that frequencies between 8-18 GHz have the ability to discriminate between thick first-year sea ice, multiyear sea ice, and lake ice. The lowest frequency, 9 GHz, was found to provide the greatest separation between these ice categories with significant levels of separation existing between angles of incidence from 15 deg to 70 deg. The radar cross-sections for the like polarizations, VV and HH, were very similar in absolute level and angular response. The radar cross-sections for VV-polarization were usually the highest in absolute level. Cross-polarization provided a slightly greater separation between these categories of ice.

8M. Soil Mechanics

AD-A087 019/6 PC **A09**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Evaluation of Soil Suction from Filter Paper.
Final rept. Oct 78-Mar 80,
Donald R. Snethen, and Lawrence D. Johnson. Jun 80, 188p Rept no. WES/MP/GL-80-4

Soil suction is a useful parameter for characterizing the effect of moisture on the volume change behavior of cohesive soil. Soil suction can be described as a measure of the pulling or tension force per unit area exerted on pore water. Two often-used energy methods for determining soil suction are the thermocouple psychrometer method and the filter paper method. In this study, laboratory suction tests were performed on 24 undisturbed soil samples to evaluate the filter paper method with respect to the thermocouple psychrometer method. The filter paper method is simple and requires little special equipment; however, the validity of filter paper as a useful tool for characterizing swelling behavior has not been well-established. The results of the study show that the filter paper method, as it was employed in this study, is as reproducible as the thermocouple psychrometer method. For the soils tested, comparisons of parameters generally found useful for characterizing swelling behavior showed that the filter paper method usually indicates less capability for swell than the thermocouple psychrometer method. This conclusion is especially significant since predictions of heave based on suction data from thermocouple psychrometers indicate higher levels of heave than those actually determined in the field. (Author)

AD-A087 020/4 PC **A07**/MF **A01**
Army Military Personnel Center Alexandria VA
A Means of Predicting Swelling Pressures of Soils Found in the Rocky Mountain Area.
Final rept.,
Walter Ernest Heinz. 19 May 80, 144p
Master's thesis.

Swelling soils are responsible for considerable damage to structures and significant monetary losses. The ability to predict and quantify this phenomenon has been the basis for much investigation over the last 50 years. To date, no one method has been found which will adequately accomplish this. In this report, the results of historical investigations are briefly summarized, as are the mechanisms which are involved in the swelling process. Based upon these historical results, two methods for examining empirical data are proposed. The first method correlates the swelling pressure to the natural dry density and the liquid limit of the soil. The second method parallels the first, except that the correlation is accomplished using an introduced parameter (plasticity index/percent of soil passing the no. 200 sieve) instead of the liquid limit. An empirical data base from the Rocky Mountain geographical area is examined using these two methods. The data base consists of both clay soils and sedimentary claystones. Predictive equations are deduced for each analysis method. The first method (using the liquid limit) produces better results, and comparisons of predicted versus measured values are presented for this method. A listing of the data used in the analyses is included in this report. (Author)

AD-A087 298/6 PC **A07**/MF **A01**
California Univ Berkeley Earthquake Engineering Research Center
Undisturbed Sampling and Cyclic Load Testing of Sands,
Sukhmander Singh, H. Bolton Seed, and Clarence K. Chan. Dec 79, 145p Rept no. UCB/EERC-79/33
Contracts DACW39-77-M-0859, DACW39-78-M-2016

Contents: Undisturbed Sampling of Sands; The Sampling Disturbance in Sands: Its Evaluation and Influence on Strength Properties; Experimental investigation of the Effect of Tube-Sampling on Cyclic Strength Characteristics of Sands; Experimental Investigation of the Effect of Block Sampling on the Cyclic Strength Characteristics of Sands; Undisturbed Sampling of Sands by Freezing and Coring; Influence of the Disturbances caused by Sample Transportation and Sample Handling in the Laboratory on Cyclic Strength Characteristics of Sands; and Conclusions.

AD-A087 371/1 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Evaluating Soil Moisture and Textural Relationships Using Regression Analysis,
Melvin B. Satterwhite. May 80, 36p Rept no. ETL-0226

Soil moisture and textural conditions are described for 179 soil samples from an arid to semiarid climate. Stepwise multiple regression analysis of these data produced four regression equations that related (1) the percent sand and clay and (2) the percent fines, with the percent soil water held at 0.33 bar (FC) and the 15 bar (WP) potentials. Evaluation of these equations showed no differences between the estimates at the 0.33 bar potential using either the percent sand and clay or the percent fines. Better estimates for the WP were obtained when the percent sand and clay were used instead of the percent fines. The differences between the estimated soil moisture at FC or WP varied less than 30 percent from the measured soil moisture values for 161 (90 percent) of the 179 soil samples. The differences between the estimated and the measured soil moisture values were not significant at the 95 percent level of confidence. The regression equations provide a method by which the potential percent soil water held at the FC or WP can be estimated from soil textural data. The accuracy and precision of the

results of applying these equations to soils of other areas has not been determined. It would seem, however, that they would be applicable in those instances where only general working estimates are needed.

AD-A950 006/7 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Trafficability of Soils.
1 Sep 45, 95p

No abstract available.

PB80-207350 PC **A11**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
The Effect of Laboratory Compaction on the Unconsolidated-Undrained Strength Behavior of a Highly Plastic Clay.
Interim rept. no. 7,
D. W. Weitzel, and C. W. Lovell. Sep 79, 242p FHWA/IN/JHRP-79-11
Sponsored in part by Indiana State Highway Commission, Indianapolis. See also report dated Oct 76, PB-267 980, and report dated Feb 79, PB80-166606.

Samples of the St. Croix clay were compacted by the kneading device to fit moisture-density values on impact compaction control curves. The compacted combinations were for low, medium and high energies at moisture contents dry, near, and wet of optimum. The samples were confined at levels representing various positions within an embankment. Both confinement and shear to failure were without drainage. Regression techniques were used to form statistically valid equations for the dependent variables of dry density and compressive strength. Dry of optimum density was a function of water content and compactive work ratio, while wet of optimum density depended upon water content only. Dry of optimum compressive strength depended upon water content, dry density, degree of saturation and confining pressure. Wet of optimum strength decreased with increasing water content. These equations will be helpful in writing compaction specifications to control as compacted stability of clay embankments.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A087 004/8 PC **A03**/MF **A01**
Naval Research Lab Washington DC
GaAs FET Device Fabrication and Ion Implantation Technology.
Summary rept. 1 Oct 78-30 Sep 79,
Kenneth J. Sleger, and Harry B. Dietrich. 25 Jun 80, 26p NRL-MR-4263, AD-E000 481

Microwave device fabrication and evaluation in conjunction with ion implantation has been selected to provide a benchmark technology for evaluation of semi-insulating GaAs and InP grown at NRL and elsewhere. Devices have been processed by a combination of conventional contact photolithography and liftoff techniques to achieve geometries with linewidths as small as 0.8 microns. A plasma deposited layer of Si3N4 has been employed as an annealing encapsulant at temperatures between 800 C and 850 C for 15-30 minutes (GaAs) or 700 C-750 C for 15 minutes (InP). Si and Se were used as the principal implant species. During this period, the Si3N4 encapsulation process and the fabrication of GaAs FETs with one micron gate lengths and noise figures below 2.4 dB at 6 GHz have become routine. Difference in microwave performance between ion implanted channel and epitaxial channel (industrially supplied) GaAs FETs was systematically correlated with various materials parameters such as mobility and light sensitivity and with static FET characteristics such as looping, backside gating, pinch-off voltage and transconductance. Experimental results indicate that good microwave performance can be obtained even though a few of the static or material characteristics are independently judged to be substandard.

AD-A087 352/1 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal AL Engineering Lab
Gold Plated Lead-Clinched Lead Solder Joint Study.
Technical rept.,
Roger L. Yocom. Sep 79, 26p DRSMI-E-79-29, AD-E950 003

In this study the effects of soldering to gold-plated lead wires as opposed to soldering to pretinned or double-tin dipped lead wires are investigated. Also investigated were the differences between Types I, II, and III lead termination methods as described in MIL-P-46843, Paragraphs 3.6.4.3.7, 3.6.4.3.8, and 3.6.4.3.9 respectively. Data generated may be utilized in the design of printed circuit boards, the revision of soldering and component specifications, and for decision criteria upon which engineering changes may be evaluated. (Author)

AD-A087 413/1 PC **A04**/MF **A01**
Litton Systems Inc San Carlos CA Electron Tube Div
Non-Periodic Helix TWT Study.
Final rept.
May 80, 53p
Contract N00173-76-C-0194

The purpose of this contract was to determine the feasibility of using various techniques to increase the operating voltages and peak power levels of helix type traveling-wave tubes. An oscillation suppression technique has been proposed which has application at high voltages and high frequencies. Based on a theoretical analysis of loading in transmission lines, calculations have been made which predict the presence of stopbands. Cold tests were performed which verified the accuracy of these calculations. A tube was built and tested. The test results indicate that the modes exist as predicted in cold test. Further testing is required to determine whether or not the stopband exists for hot test operation.

AD-A087 427/1 PC **A12**/MF **A01**
Hughes Aircraft Co Culver City CA Technology Support Div
Capacitors for Aircraft High Power.
Final rept. May 75-Oct 79,
Robert D. Parker. Apr 80, 261p AFWAL-TR-80-2037
Contract F33615-75-C-2021

This report describes an exploratory program conducted to develop reliable lightweight pulse discharge capacitors for airborne application. The specific duty was a 1 minute burst every 2 hours, and both low (50pps) and high (300pps) repetition rate service was to be considered. The energy density goals were 400 to 1100 J/kg with a 20 microsec capacitor current pulse width. A five layer polysulfone/kraft paper dielectric was selected for high rate service, while polyvinylidene fluoride/kraft paper was chosen for the low rate service. Both mineral oil and dioctylphthalate fluids were used. Tension-controlled winding was used to eliminate failure producing folds. Reduced temperature drying further reduced wrinkles. Special filtration, purification, and cleaning produced very high resistivity fluids free from particles. A highly-instrumented test bay accurately simulated a pulse-forming network environment and allowed detailed and accurate testing. The best single section high rate results were 550 J/kg at 100,000 - 1,000,000 shot life at double the specified duty, while the best low rate results were slightly higher. Case weight minimization was studied, and three prototype lightweight cases were built. Several techniques for smoothing rough capacitor foils were examined, and a flame technique was selected as being most easily implemented. Problems of terminating extended foils were examined, and a flame-spray method selected as most practical.

AD-A087 432/1 MF **A01**
University of Southern California Los Angeles Dept of Electrical Engineering
Charge Storage, Retention and Endurance in MNOS Devices.
Final rept. 10 Apr 77-13 Apr 80,
Kurt Lehovec. 13 Jun 80, 46p ARO-14744.6-EL
Contract DAAG29-79-C-0095, Grant DAAG29-78-G-0100
Sponsored in part by grants DAAG29-77-G-0123.
Availability: Microfiche copies only.

The steady state current through the double dielectric of MNOS capacitors on p-silicon substrate was measured as function of temperature for several fixed fields in the silicon oxide of a polarity promoting hole flow from the silicon. It is shown that the availability of empty recipient trap states for holes tunneling from the silicon into the nitride controls the current. The occupancy of these trap states is governed by Frenkel-Poole detrapping at elevated temperatures and by Fowler-Nordheim tunnel emission from the traps at low temperature. Transient charging measurements support this interpretation. (Author)

PATENT-4 131 793 Not available NTIS
Department of the Navy Washington DC
Lateral Photodetectors.
Patent,
Ronald G. Stoutmeyer, and William O. Alltop.
Filed 10 Aug 76, patented 26 Dec 78, 6p AD-D007 393/2, PAT-APPL-713 570
Supersedes PAT-APPL-713 570-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A lateral photodetector having a segmented annular ring formed on the output surface. The segments are electrically interconnected to provide four interleaved output electrodes. (Author)

PB80-207038 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Technology Program. Progress Briefs.
Interim rept. Jan-Mar 80,
W. Murray Bullis. Jun 80, 13p NBSIR-80-2006-2
ARPA Order-2397
See also report for Jul-Sep 78, PB-294 846, and report dated Apr 80, PB80-191521. Sponsored in part by Department of Energy, Washington, DC., Defense Nuclear Agency, Washington, DC., and Charles Stark Draper Lab., Inc., Cambridge, MA.

This report provides information on the current status of NBS work on measurement technology for semiconductor materials, process control, and devices. Results of both in-house and contract research are covered. Highlighted activities include: studies of MOSFET dc profiler, heavy doping effects in silicon, PVW applications, ion-implanted dopant profiles, optical linewidth measurements on wafers, process-induced radiation damage, transistor switching characteristics, and acoustic emission testing. Brief descriptions of selected ongoing projects are included, and recent publications and publications in press are listed. The report is not meant to be exhaustive, contacts for obtaining further information are listed.

9B. Computers

AD-A086 984/2 PC **A06**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Transmitting Abstract Values in Messages.
Master's thesis,
Maurice Peter Herlihy. May 80, 125p Rept no. MIT/LCS/TR-234

Contract N00014-75-C-0661, Grant NSF-MCS74-21892

This thesis develops primitives for a programming language intended for use in a distributed computer system where individual nodes may have different hardware or software configurations. Our primitives are presented as extensions to the CLU language. We assume that differences in hardware and in administrative policy require that individual nodes be free to choose their own local representations for common types, including user-defined types. Our main objective is to provide primitives to communicate values of user-defined type. Our primitives support a large degree of node autonomy, without requiring that communicating nodes have prior knowledge of one another's special characteristics. We argue that the precise meaning of value transmission is type-dependent; thus the user, not the language, must control the meaning of transmission for values of a type. (Author)

AD-A086 985/9 PC **A09**/MF **A01**
General Electric Co Sunnyvale CA
Software Quality Metrics Enhancements. Volume I.
Final rept. Jun 78-Jul 79,
James A. McCall, and Mike T. Matsumoto. Apr 80, 187p RADC-TR-80-109-VOL-1
Contract F30602-78-C-0216
See also Volume 2, AD-A086 986 and AD-A049 014, AD-A049 015, AD-A049 055.

Software metrics (or measurements) which predict software quality have been refined and enhanced. Metrics were classified as anomaly-detecting metrics which identify deficiencies in documentation or source code, predictive metrics which measure the logic of the design and implementation, and acceptance metrics which are applied to the end product to assess compliance with requirements. A Software Quality Measurement Manual was produced which contained procedures and guidelines for assisting software system developers in setting quality goals, applying metrics and making quality assessments. (Author)

AD-A086 986/7 PC **A04**/MF **A01**
General Electric Co Sunnyvale CA
Software Quality Measurement Manual. Volume II.
Final technical rept. Jun 78-Jul 79,
James A. McCall, and Mike T. Matsumoto. Apr 80, 70p RADC-TR-80-109-VOL-2
Contract F30602-78-C-0216
See also Volume 1, AD-A086 985.

For abstract see AD-A086 985.

AD-A087 060/0 PC **A02**/MF **A01**
Michigan Univ Ann Arbor Dept of Electrical and Computer Engineering
Numerical Studies in Computer Aided Design. Part II. Studies in High Speed Computation.
Final rept.,
D. A. Calahan. 12 May 80, 16p AFOSR-TR-80-0546
Grant AFOSR-75-2812

This report summarizes research investigating (1) algorithms for the vectorized direct solution of sparse simultaneous equations, and (2) the application of vector processors to aerodynamic fluid flow. The research was performed between April 1, 1975 and March 31, 1980. (Author)

AD-A087 167/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Intermodulation Generation Diagnosis by Analytical and Computer Techniques. Chapter VI.
Final rept.,
A. C. Ehrlich, G. N. Kamm, and G. C. Bailey. 7 Jul 80, 11p Rept no. NRL-MR-4233-CH-6
See also Chapter 1, AD-A049 113 and Rept. no. NRL-MR-4233, AD-A086 995.

No abstract available.

AD-A087 251/5 PC **A02**/MF **A01**
Illinois Univ At Chicago Circle Dept of Mathematics
A Computer Algorithm for Generating a Basis of the Trades on t-Designs.
Interim rept.,
A. Hedayat, and H. L. Hwang. Jun 80, 21p AFOSR-TR-80-0561
Grant AFOSR-76-3050

To study the existence and nonexistence of t-designs it is enough to investigate a combinatorial structure called trades on t-designs. This report presents a computer algorithm for generating the basis of trade on t-designs. The technique is illucidated via several examples.

AD-A087 310/9 MF **A01**
Georgia Inst of Tech Atlanta School of Information and Computer Science
Testing COBOL Programs by Mutation. Volume I. Introduction to the CMS.1 System.
Master's thesis,
Jeanne Marie Hanks. Feb 80, 75p
Contract N00014-79-C-0231, Grant DAAG29-78-G-0121
See also Volume 2, AD-A087 365.
Availability: Microfiche copies only.

Program mutation is a testing technique which has been applied to Fortran programs(ABDLS). This thesis will describe the application of mutation to the Cobol language in an automated program mutation system. The thesis will describe the development of a Cobol Mutation System (CMS.1), its testing using Fortran mutation analysis, and the subset of Cobol that is supported by CMS.1. The internal representation selected to represent the Cobol source statements and a description of the mutant operators that are implemented in CMS.1 will also be supplied. (Author)

AD-A087 338/0 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
INTERLISP Maintenance.
Final rept.,
Alice K. Hartley. 1979, 10p Rept no. BBN-4304
Contract N00039-78-C-0300, ARPA Order-3554

INTERLISP is an exceedingly powerful programming environment that makes it possible to implement large, complex systems in a very short time. The INTERLISP Maintenance contract covers the following tasks: Maintenance of the system level portion of INTERLISP, including tracking down and fixing bugs, modifying and improving existing features in response to the needs of the ARPA community, and keeping up with hardware and operating system changes; Documentation of the system level portions of INTERLISP for inclusion in the INTERLISP manual; Release of new systems to the ARPA community; and Installation of INTERLISP in the National Software Works.

AD-A087 340/6 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
USAFSAM Waiver File Intelligent Terminal: Hardware Reference Manual.
Final rept. Oct 76-Jun 79,
Michael L. Tworek, M. Edward Womble, and Shelburne D. Wilson. Apr 80, 22p Rept no. SAM-TR-80-1

The hardware design and configuration of an intelligent microcomputer terminal is described. This terminal is used to access a data base on a larger main-frame computer. The system was designed to provide maximum flexibility at the users fingertips by making the complex data-base management system (DBMS) of the main-frame computer transparent to the user. All aspects of the system configuration are outlined to provide sufficient knowledge for maintenance and repair. (Author)

AD-A087 365/3 PC **A08**/MF **A01**
Georgia Inst of Tech Atlanta School of Information and Computer Science
Testing Cobol Programs by Mutation. Volume II. CMS 1 System Documentation,
Jeanne Marie Hanks. Feb 80, 159p Rept no. GIT-ICS-80/04-VOL-2
Contract N00014-79-C-0231, Grant DAAG29-78-G-0121
See also Volume 1, AD-A087 310.

This document is a continuation of AD-A-083 078.

AD-A087 372/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
LOOP Iteration Macro,
Glenn Burke, and David Moon. Jul 80, 24p Rept no. MIT/LCS/TM-169
Contract N00014-75-C-0661, Grant PHS-1-P41-RR-01096-04

LOOP is a Lisp macro which provides a programmable iteration facility. The same LOOP module operates compatibly in both Lisp Machine Lisp and Maclisp (PDP-10 and Multics). LOOP was inspired by the 'FOR' facility of CLISP in InterLisp; however, it is not compatible and differs in several details. (Author)

AD-A087 412/3 PC **A14**/MF **A01**
Yale Univ New Haven CT Dept of Computer Science
Draft Software Metrics Panels Final Report. Papers Presented at the 30 June 1980 Meeting on Software Metrics, Washington DC.
Research rept.,
Alan J. Perlis, Frederick G. Sayward, and Mary Shaw. Jun 80, 301p Rept no. RR-182/80
Contract N00014-79-C-0672

Software metrics is a new area of computer science aimed at assigning quantitative indices of merit to software. Here software means more than simple source code; 'software' as a generic for all the stages of tailoring a computer system to solve a problem is used here. All software passes through the following seven stages in its life cycle: (1) requirements analysis, (2) specification, (3) design, (4) implementation, (5) testing and integration, (6) maintenance and enhancement, and (7) replacement or retirement. Since software specification is always imprecise and since the demands on software change with time, backtrack cycles to earlier stages often take place. It is not uncommon for several stages to co-exist and influence each others progress.

PB80-204969 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Honeywell Information Systems, COBOLA 2.0, Level 6, MOD 0400 COBOL Compiler.
Validation summary rept.
16 Jul 80, 64p CCVS74-VSR615

The Validation Summary Report (VSR) for the HIS Level 6 COBOL Compiler Version 2.0 (GCOS6 Version 12.1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the High level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-205214 PC **A05**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Features of the Transport and Session Protocols. Draft Report,
John Burruss. Mar 80, 78p BBN-4361, ICST/HLNP-80-1, NBS-GCR-80-245
Contract NB79-SBCA-0092

The National Bureau of Standards, Institute for Computer Sciences and Technology (ICST), has initiated a program to develop computer network protocol standards as Federal Information Processing Standards (FIPS). This is one of a series of draft reports prepared under the network protocol standards program for distribution to government agencies, voluntary standards organizations, computer and communications equipment manufacturers, and other interested parties. The draft report analyses protocol features as a method of determining the kernel set of essential features of a protocol along with the clusters of value-added features which will support various application categories.

9C. Electrical and Electronic Engineering

AD-A087 061/8 PC **A05**/MF **A01**
Ohio State Univ Columbus ElectroScience Lab

Joint Services Electronics Program.
Annual rept. no. 2, Oct 78-Oct 79.
Dec 79, 85p Rept no. ESL-710816-6
Contract N00014-78-C-0049

This report presents the second annual review of research at Ohio State sponsored by the Joint Services Electronics Program (JSEP). The research is in the area of electromagnetics and the specific topics are: (1) Diffraction Studies; (2) Hybrid Techniques; (3) Antenna Studies; (4) Time Domain Studies; and (5) Adaptive Array Studies. (Author)

AD-A087 398/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Robust Control of Multiterminal DC/AC Systems,
N. A. Lehtomaki, S. M. Chan, N. R. Sandell, Jr., M. Athans, and J. Carrig. 31 Aug 79, 11p
Contract DOE-ET-78-C-01-3395

The successful application of two terminal dc links suggests that even greater flexibility in power dispatch and enhancement in stability can be realized by a multiterminal dc (MTDC) system embedded in an interconnected ac grid. Several utilities are looking into the possibility of building MTDC systems by adding new terminals to the existing dc links or by connecting dc links that are located in close proximity. It is quite conceivable that MTDC will become a major part of our energy delivery system by the end of this century. The intent of this paper is to illustrate how the MTDC control problem can be analyzed from a physical viewpoint, and how the physical insights can be utilized to arrive at a reasonable, robust control design. The main emphasis is on robustness. Some of the latest results in robustness theory are used in the design stage as well as in analyzing the final design.

9E. Subsystems

AD-A086 940/4 PC **A02**/MF **A01**
State Univ of New York At Stony Brook Dept of Physics
Observation of Phase Coherence among Multiple Josephson Oscillators.
Technical rept. 1 May 79-30 Apr 80,
A. K. Jain, P. Mankiewich, and J. E. Lukens. 4 Dec 79, 4p
Contract N00014-75-C-0769
Pub. in Applied Physics Letters, v36 n9 p774-776, 1 May 80.

No abstract available.

AD-A086 993/3 PC **A02**/MF **A01**
RCA Government Communications Systems Camden NJ
Reliability Prediction for Power Controller - DC, Load Switching.
14 Mar 80, 17p
Contract N62269-77-C-0413

This analysis fulfills the requirements of CDRL Sequence No. A003, Reliability Prediction Report. It has been conducted in accordance with Task R2, Reliability Analysis and Prediction, of the D.C. Power Controller Reliability Program Plan, 15 October 1977.

AD-A086 994/1 PC **A04**/MF **A01**
RCA Government Communications Systems Camden NJ
AC Controller Feasibility Study. Revision A.
Final rept.,
Eugene Lachocki, John B. McMackin, and C. L. Whitman. 31 May 79, 57p Rept no. RCA-552-1008-REV-A
Contract N62269-78-C-0394
See also Rept. no. NADC-30-TS-7602.

This report presents design concepts for meeting the established requirements for AC Power Controllers specified in NADC-30-TS-7602 document. Two Solid State Power Controllers (SSPC) were designed: 115V at 5A, 400 Hz and 26V at 1A, 400 Hz. The basic functional requirements for both controllers are as follows: (a) to provide switching between a power bus and the load; (b) to carry rated current with a high degree of efficiency; (c) to provide automatic opening under overload conditions with specified delay characteristic; (d) to provide isolation for control element; and (e) to be capable of being controlled and reset remotely. Since size is a primary constraint, the design effort was directed toward the 115V controller with the greatest power delivery capability. The lower rated units would utilize identical control circuitry but would take advantage of smaller components in the power switching stage. The components and circuits described in this report are representative of controllers requirements with consideration of suitability for hybridization.

AD-A087 040/2 PC **A05**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Artwork Analysis Tools for VLSI Circuits.
Master's thesis,
Clark Marshall Baker. Jun 80, 78p Rept no. MIT/LCS/TR-239
Contract N00014-75-C-0661

Current methods of designing Very Large Scale Integrated (VLSI) chips do not insure that the chips will perform correctly when manufactured. Because the turnaround time on chip fabrication varies from a few weeks to a few months, a scheme other than try it and see if it works is needed. Checking of chips by hand simulation and visual inspection of checkplots will not catch all of the errors. In addition, the number of transistors per chip is likely to increase from ten thousand to over a million in the next few years. This increase in complexity precludes any manual verification methods; some better method is needed. A series of programs that use the actual mask descriptions for input are described. These programs perform various levels of checks on the masks, yielding files suitable for simulation. Some of the checks are the usual 'design rule' checks of looking for minimum line widths and adequate spacing between wires. However, there are many more constraints in VLSI circuits than are expressed by usual design rules. The programs check these constraints using the mask descriptions as input. All of the errors mentioned so far can be classified as syntactic errors; in addition, certain errors are detected. The detection of semantic errors requires various levels of simulation. The input to the simulators is derived from the artwork.

AD-A087 156/6 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
1 GHz Surface-Acoustic-Wave Plate Convolvers,
Roger D. Colvin, Paul H. Carr, George A. Roberts, and E. J. Charlson. 1979, 6p Rept no. RADC/ETR-80-0019
Pub. in Ultrasonic Symposium Proceedings, IEEE Cataloge Number 79CH1482-9SU, 1979.

No abstract available.

AD-A087 158/2 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Saw Bilinear Mixer,
Roger D. Colvin, Paul H. Carr, and E. J. Charlson. 1979, 6p Rept no. RADC/ETR-80-0021
Pub. in Ultrasonics Symposium Proceedings, IEEE Cataloge Number 79CH1482-9SU 1979.

No abstract available.

AD-A087 159/0 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Encoding and Decoding at 1 GHz with SAW Tapped Delay Lines,
Paul H. Carr, Roger D. Colvin, and Jose H. Silva. 1979, 6p Rept no. RADC-ETR-80-0022
Pub. in Ultrasonics Symposium Proceedings, IEEE Cat, 79CH1482-9SU 1979.

No abstract available.

AD-A087 197/0 PC **A03**/MF **A01**
Raytheon Co Bedford MA
Design, Fabrication and Test of a CCD-Based Correlator/Convolver.
Interim rept. 6 Apr-6 Jul 79,
Arthur M. Cappon, and Jay P. Sage. Feb 80, 31p
RADC-TR-79-348
Contract F19628-77-C-0260

Tests conducted since the first interim report have emphasized the characterization of the elements of the correlator/convolver, rather than the performance of the complete device. Prior work having vindicated the choice of the four transistor bridge configuration, the present interim period focused on the adequacy of the floating gate and source followers as designed. An extensive characterization of the floating-gate-output CCD test pattern was carried out. Maximum signal swing, linearity and noise level were measured with four different input techniques. All results were as good or better than expected. Accuracy of about one percent could be maintained over a signal range of about 4.25 volts. Surprisingly, the potential equilibration techniques gave linearity at least as good as that obtained with the diode-cutoff method. However, the potential equilibration input was up to 15 dB quieter. The signal to noise ratio referenced to the 1% nonlinearity signal level was approximately 80 dB, 10 dB better than the design goal. With the additional 6 dB enhancement of signal over noise of the bridge multiplier as compared to conventional multiplier designs, a net effective input signal to noise ratio of about 85 dB is expected in the complete correlator/convolver. Finally, the design of the deliverable 256-stage correlator was completed and entered into the mask-making CAD system. The problem reported earlier with direct feedthrough of the drain inputs was found to be due to a difference in characteristics between transistors located under one and under two layers of polysilicon and will be corrected in this final design.

AD-A087 446/1 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Advanced Electronic Technology.
Quarterly technical summary rept. 1 Nov 79-31 Jan 80,
Alan J. McLaughlin, and Alan L. McWhorter. 15 Feb 80, 20p ESD-TR-79-323
Contract F19628-80-C-0002

Partial contents: Data Systems - Digital integrated circuits, and Computer systems; and Solid State - Solid state device research, Quantum electronics, Materials research, Microelectronics, and Analog device technology.

PATENT-4 201 988 Not available NTIS
Department of the Navy Washington DC
Wideband VHF Antenna.
Patent,
Douglas M. Dilley. Filed 5 Mar 79, patented 6 May 80, 5p AD-D007 403/9, PAT-APPL-6-017 749
Supersedes PAT-APPL-6-017 749, AD-D005 854. Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A wideband VHF antenna operable simultaneously on multiple frequencies having an instantaneous bandwidth greater than one octave and having a total length less than one-quarter wavelength at the lowest operating frequency. A wideband impedance transformer is connected to the antenna total radiating structure at the feed point. The radiating structure comprises a conductor secured to a dielectric whip. The conductor is comprised of two sections of length L1 connected by a short length of electrical conductor to form a large loop. The radiating structure further comprises a second electrical conductor of length L2 connected by another short length of electrical connector so as to form a small loop. The length of L2 conductor is disposed in the neutral plane between the two conductor sections of length L1. (Author)

PB80-205990 PC **A03**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
An Iterative Approach to the Deconvolution of the Narrowband Outputs of a Conventional Beamformer.
Technical rept.,

D. A. Gray. Feb 80, 28p WSRL-0141-TR, AR-001-954

In conventional beamforming the estimated noise power wavenumber spectrum is the convolution of the incident distribution with the array response. By removing the effect of the array response an improved estimate of the incident wave-number spectrum may be obtained. In particular the method of progressive substitutions has been widely used to deconvolve the array window. By assuming all the incident signals to be a linear superposition of a finite number of plane waves this method is extended to deconvolve the narrowband beam outputs of a conventional beamformer. Two methods are used, the first to deconvolve the complex beam amplitudes and the second to deconvolve the beam powers. The convergence of these proposed iterative solutions is proved and the relationship of the limits to some recently proposed quadratic estimators is shown.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A087 083/2 PC **A15**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Energy Self-Sufficiency for Air Force Logistics Command (AFLC) Bases: An Initial Investigation.
Master's thesis,
Charles Ray Hatch, and Robert E. Mansfield, Jr. Jun 80, 344p Rept no. AFIT-LSSR-1-80

To obtain Energy Self-Sufficiency for Air Logistics Centers by the year 2000, has been a stated goal since 1978. The purpose of this thesis was to develop a working definition of Energy Self-Sufficiency; to develop a statistical model for forecasting aggregate energy demand for the Air Logistics Centers; and to research some possible unconventional technologies which may assist in attaining the Energy Self-Sufficiency goal. This research revealed that the goal is rather limited and should be attainable based on the definition provided; aggregate energy demand for the Air Logistics Centers can be predicted by estimating heating and cooling degree days; and waste to energy conversion processes and solar technologies offer some potential for attaining the overall goal. (Author)

NP-23596 PC **A13**/MF **A01**
Bremen Univ. (Germany, F.R.).
Formation of Oil Prices of the Organization of Petroleum Exporting Countries (OPEC).
F. Akhtarekhavari. Apr 77, 288p
In German.
U.S. Sales Only.

Following a few introductory explanations on the significance of petroleum within the framework of the power industry of the industrial companies, as well as on the arising and development of OPEC, the stages of oil price policy of the OPEC countries are looked at critically. This development has involved a series of negative consequences for the oil-producing countries themselves which could have been avoided by an optimum oil price policy. A series of interrelationships are investigated to gain understanding of the overall situation which were of essential importance for the oil price formation so far. Here included are the petroleum demand, supply structure and marketing in the industrial countries, availability of alternative energy carriers and their consequences for the future oil price policy, as well as the possibilities and limits of an increasing degree of self-supply. The possibilities and limits to limiting the OPEC cartel are examined whereby the dialogue between the supplier and consumer states is recognized as an important means to do away with the OPEC cartel. Coupling oil price and monetary policy is regarded as alternative to hitherto oil price policies, an alternative which is being fully considered by the interests of the OPEC states in the present existing situation, as well as in the aimed new world economy ordinance. (ERA citation 04:029157)

PAT-APPL-6-029 962 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Solar Coal Gasification.
Patent Application,
D. W. Gregg. Filed 13 Apr 79, 15p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Apparatus for using focused solar radiation to gasify coal and other carbonaceous materials is described. Incident solar radiation is focused from an array of heliostats onto a tower-mounted secondary mirror which redirects the focused solar radiation down through a window onto the surface of a vertically-moving bed of coal, or a fluidized bed of coal, contained within a gasification reactor. The reactor is designed to minimize contact between the window and solids in the reactor. Steam introduced into the gasification reactor reacts with the heated coal to produce gas consisting mainly of carbon monoxide and hydrogen, commonly called synthesis gas, which can be converted to methane, methanol, gasoline, and other useful products. One of the novel features of the invention is the generation of process steam at the rear surface of the secondary mirror. (ERA citation 05:030063)

PB80-203177 PC **A07**/MF **A01**
Wilson (J. W.) and Associates, Inc., Washington, DC.
Use of a Future Test Year for Electric Utility Ratemaking.
Final rept.,
Ralph E. Miller. Nov 79, 139p NBS-GCR-ETIP-79-75
Contract NBS-5-35894

This report is one of a series involving work by the Experimental Technology Incentives Program (ETIP) designed to accelerate or otherwise improve decisions in electric utility rate cases in state regulatory commissions. The objective is to provide incentives for technological innovation. The future test year method projects an electric utility's cost forward into the first full year when proposed new rates will be in effect so that rates can be matched to costs. The report explains how all the elements of a test year cost of services may be projected into the future.

PB80-204514 PC **A03**/MF **A01**
Office of the Federal Inspector for the Alaska Natural Gas Transportation System, Washington, DC.
Quarterly Report (1st) to the President and Congress on the Construction of the Alaska Natural Gas Transportation System.
Rept. for Jul-Sep 79.
Oct 79, 30p OFI-80/3

This report discusses the progress made during the fourth quarter FY '79 on the Alaska Natural Gas Transportation System. It includes background and historical data regarding the project.

PB80-204522 PC **A02**/MF **A01**
Office of the Federal Inspector for the Alaska Natural Gas Transportation System, Washington, DC.
Quarterly Report (2nd) to The President and Congress on Construction of the Alaska Natural Gas Transportation System.
Rept. for Oct-Dec 79.
Jan 80, 19p OFI-80/4

This report discusses progress made during the first quarter of FY '80 on the Alaska Natural Gas Transportation System.

PB80-204530 PC **A02**/MF **A01**
Office of the Federal Inspector for the Alaska Natural Gas Transportation System, Washington, DC.
Quarterly Report (3rd) to The President and Congress on Construction of the Alaska Natural Gas Transportation System.
Rept. for Jan-Mar 80.
Apr 80, 24p OFI-80/5

This report discusses progress made during the second quarter FY '80 on the Alaska Natural Gas Transportation System.

PB80-204639 PC **A02**/MF **A01**
EIC Corp., Newton, MA.
Review of Procedures for Determining Corporate Average Fuel Economy. Volume I. Executive Summary.
Final rept. 30 Sep 77-31 Mar 79,
F. T. Rabe. Jul 79, 21p C-515-VOL-1, DOT-HS-805 396
Contract DOT-HS-7-01771
See also Volume 2, PB80-204647.

Federal regulations impose financial penalties and credits on automobile manufacturers based upon 0.1 mpg increments in their Corporate Average Fuel Economy (CAFE) values for each model year. CAFE values are defined legally by a set of sampling and estimation procedures that neglect inherent uncertainties. This report characterizes alternative statistical procedures to quantify the inherent uncertainties in average fuel economy and examines their cost-effectiveness in achieving 0.1 mpg precision.

PB80-204647 PC **A07**/MF **A01**
EIC Corp., Newton, MA.
Review of Procedures for Determining Corporate Average Fuel Economy. Volume II. Technical Report.
Final rept. 30 Sep 77-31 Mar 79,
F. T. Rabe. Jul 79, 145p C-515-VOL-2, DOT-HS-805 397
Contract DOT-HS-7-01771
See also Volume 1, PB80-204639.

Federal regulations impose financial penalties and credits on automobile manufacturers based upon 0.1 mpg increments in their Corporate Average Fuel Economy (CAFE) values for each model year. CAFE values are defined legally by a set of sampling and estimation procedures that neglect inherent uncertainties. This report characterizes alternative statistical procedures to quantify the inherent uncertainties in average fuel economy and examines their cost-effectiveness in achieving 0.1 mpg precision.

PB80-205313 PC **A06**/MF **A01**
Insights West, Inc., Los Angeles, CA.
Solar-Augmented Applications in Industry. Final Report for 1979,
John H. Williams, Steven C. Whitney, and Heather Ball. Feb 80, 124p GRI-78/0036
Contract GRI-5011-343-0105

Through 200 Field Interviews, the process needs of a wide variety (over 150 different SIC's) of industries were examined and matched to existing solar hardware. Through a screening process using available annual insolation's relationship to process thermal needs, a ranking of the most likely candidates for early entry application of solar was then developed. The institutional aspects of solar's use by industry were examined, as were generic solar collector performance variables. Significant feedback was obtained relative to the attitudes of industrial plant executives concerning solar.

PB80-205354 PC **A13**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Energy Efficiency Improvement of Residential and Commercial Gas Appliances. Phase I. Research, Development and Demonstration Planning. Annual Report for 1979,
P. E. Pickett, W. C. Racine, D. L. Peterka, and R. C. Erickson. Apr 80, 299p SAI-444-80-328-LJ, GRI-79/0028
Contract GRI-5011-345-0095

Energy efficiency improvement design concepts for residential and commercial gas water heaters, cooking equipment and clothes dryers were exam-

ined in this study. The following items relating to the efficiency improvements were examined: possible annual natural gas savings; economic factors of payback period and change in life cycle cost; durability and serviceability; utility and consumer appeal; legal and marketplace barriers; past or current related work. Using these items as criteria, an evaluation procedure was applied to all design concepts.

PB80-205420 PC **A09**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
An Evaluation of Natural Gas Supply and Demand Models.
Final rept. Oct 78-Oct 79,
Anna Lou Fletcher. Dec 79, 184p GRI-79/0053
Contract GRI-5011-381-0084

The report is a detailed evaluation of all major natural gas supply, demand, and integrating models. The purpose of the analysis was to understand the capabilities and limitations of each model, in order to determine how each could be utilized in support of GRI's planning and evaluation activities. The final report identifies the major technical and management issues associated with these models and presents an outline of a plan for modeling and analytical support for GRI.

PB80-206121 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
A Comparative Study of Public Beliefs About Five Energy Systems.
Final rept.,
Kerry Thomas, Dagmar Maurer, Martin Fishbein, Harry J. Otway, and Ron Hinkle. c1980, 38p RR-80-15

The risks associated with alternative energy systems and public perceptions of these risks, have become important constraints in the selection of energy strategies. This research report presents results of an application of an attitude-measurement methodology which explores the beliefs held by the public with respect to 5 alternative energy sources--nuclear, coal, oil hydro, and solar. The method used permits comparison of attitudes and also of the underlying belief dimensions which characterize each energy source. Emphasis is given to a differential analysis of the belief systems of those subgroups most in favor of (PRO) and most against (CON) the use of nuclear energy.

PB80-206162 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Nuclear Energy: The Accuracy of Policy Makers' Perceptions of Public Beliefs.
Final rept.,
Kerry Thomas, Elisabeth Swaton, Martin Fishbein, and Harry J. Otway. c1980, 45p RR-80-18

This report analyzes the attitudes and underlying beliefs, with respect to nuclear energy, of senior Austrian civil servants in the Ministry responsible for energy matters, who were in a position to influence energy policies. It also reports on the accuracy of their perceptions of the attitudes and beliefs of those subgroups of the public sample most in favor of and most against the use of nuclear energy.

PB80-207251 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Energy Research Center.
Building a Library for Energy and Appropriate Technology,
Lawrence J. Reynolds. Dec 79, 22p SRC-TR-77-555.27, CSA-LN-2593
Grant CSA-30200-L-76-01

The report is one in a series of bulletins to provide technical assistance to administrators of programs to weatherize the homes of poor persons.

PB80-207384 PC **A03**/MF **A01**
Southern Illinois Univ. at Edwardsville. Center for Urban and Environmental Research and Services.
Conservation of Fuels in the St. Louis SMSA: Projections from Alternative Residential Land Use Patterns and Transportation Strategies for 1995,
Norval D. Wallace, and Alfred Kahn. Nov 78, 39p CUERS-8

The research in Chapter One, 'Land Use Patterns and Their Effect on Energy Consumption for the St. Louis SMSA, Projections for 1995', is based on a land use/energy model which uses an actual regional land use plan and local energy data. The results of the model, projected for five alternative residential growth patterns in 1995, indicate that although energy consumed by residential units does not vary significantly with shifts in the location of new residential housing, transportation energy consumption is substantially affected. Chapter Two, 'Energy Conservation Potential of Alternative Transportation Strategies for the St. Louis SMSA', further examines transportation energy consumption by evaluating four energy-conserving transportation strategies.

PB80-209794 PC **A09**/MF **A01**
Stanford Univ., CA. Center for Technology Assessment and Resource Policy.
The CTARP Energy Facility Siting Study. Volume I: Coastal Facility Siting and the National Interest,
John T. McAlister, Jr., and Jeffrey D. Roughgarden. Apr 79, 180p NOAA-80061105
See also Volume 2, PB80-209802.

The first of four volumes of a study dealing with energy facility siting in the coastal zone and the national interest presents a conceptual summary and policy analysis. The problems and common structure of energy facility siting controversies are reviewed and the current role of coastal management is commented on briefly. The meaning of interest statements and related concepts is discussed and a presentation and comparison of two opposing views of the national interest are presented. The institutional mechanisms needed to initiate the sample process are described. The nature of the process dealing with procedural decisions, cooperative analysis, and bargaining is discussed.

PB80-209802 PC **A18**/MF **A01**
Stanford Univ., CA. Center for Technology Assessment and Resource Policy.
The CTARP Energy Facility Siting Study. Volume II. Impact Analysis and Case Studies,
John T. McAlister, Jr., and Jeffrey D. Roughgarden. Apr 79, 408p NOAA-80061106
See also Volume 1, PB80-209794.

The second volume of a four volume study discusses the business of analyzing the effects of energy facility siting. It sets forth a conceptual framework for and philosophy of analysis, establishing criteria for good analysis. It also discusses some of the problems of analysis within a strategic contest and the role of analysis in a multiparty decision process. The philosophical discussion is brought down to earth by presenting a demonstration of the techniques advocated. Specifically, the demonstration analyzes the proposed Outer Continental Shelf (OCS) lease sale No. 48, off the shore of southern California, and discusses what each of the major participants in the controversy surrounding the lease sale stands to gain or lose.

PB80-210115 PC **A22**/MF **A01**
Office of Technology Assessment, Washington, DC.
An Assessment of Oil Shale Technologies.
Jun 80, 522p OTA-M-118
Library of Congress catalog card no. 80-600101.
See also Volume 2, PB80-210123.

This report explores means of developing the oil shale resources of the Western United States and also reviews the consequences of development in terms of impact on the physical and social environments. Background information on the nature of oil shale is provided as is an evaluation of technologies for recovery of shale oil. Policy options which address barriers that could hinder the establishment of the industry are presented.

PB80-210123 PC **A05**/MF **A01**
Office of Technology Assessment, Washington, DC.
An Assessment of Oil Shale Technologies. Volume II: A History and Analysis of the Federal Prototype Oil Shale Leasing Program.
Jul 80, 83p OTA-M-119
Library of Congress catalog card no. 80-600102.
See also Volume 1, PB80-210115.

This volume discusses the Federal Prototype Oil Shale Leasing Program that began in 1974 when the U.S. Department of the Interior sold leases to four tracts in the oil shale regions of Colorado and Utah. A prior leasing attempt in 1968 is also described because it provides an historical perspective about the imperatives and the restraints that have inhibited such development. The report includes discussions of political, economic, environmental, and energy-related factors that affected both the 1968 leasing attempt and its successor, and status are examined to determine if those goals have been met or are likely to be met in the foreseeable future.

PB80-813579 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Aircraft Fuel Conservation. 1974-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Jul 80,
Gerald F. Zollars. Aug 80, 50p
Supersedes NTIS/PS-79/0764. Sponsored in part by National Technical Information Service, Springfield, VA.

These citations to articles from the international literature concern means to conserve fuel in airline operations. Included are articles dealing with aircraft design, fuels, engine design, propulsion efficiency, and operating procedures which conserve fuel. (This updated bibliography contains 187 citations, 27 of which are new entries to the previous edition.)

PB80-928115 PC **E02**
Central Intelligence Agency, Washington, DC.
Energy Decision Making in the Soviet Union; a Reference Aid.
Wall chart.
Aug 80, 23p CR-80-10623
Color illustrations reproduced in black and white. Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928100.

This chart presents the major organizations involved in the formulation of Soviet energy policy and delineates their suspected interaction. Operational command organizations are highlighted as well as advisory bodies, and officials thought to be principal energy policymakers are emphasized in the lists of particular bureaucracies.

10B. Power Sources

AD-A087 022/0 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Tests of a Lightweight 200 kW MHD Channel and Diffuser.
Final rept. Mar 77-Dec 78,
James F. Holt, and Jerome Pearson. Mar 80, 76p
Rept no. AFWAL-TR-80-2021

A 200 kW lightweight MHD generator channel and diffuser were tested over a regime of 235 individual firings of the open cycle combustor systems. The diagonal conducting wall channel delivered full rated power with no interelectrode breakdown. Vibration measurements indicated no fatigue of the channel structure. (Author)

PATENT-4 189 650
Not available NTIS
Department of Energy, Washington, DC.
Isolated Trigger Pulse Generator.
Patent,
K. Aaland. Filed 24 Oct 78, patented 19 Feb 80, 8p PAT-APPL-954 252

Supersedes PAT-APPL-954 252-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A trigger pulse generation system capable of delivering a multiplicity of isolated 100 kV trigger pulses with picosecond simultaneity is described. (ERA citation 05:031382)

PATENT-4 200 815
Not available NTIS
Department of Energy, Washington, DC.
MHD Generating System.
Patent,
M. Petrick, E. S. Pierson, and F. Schreiner. Filed 19 Sep 78, patented 29 Apr 80, 6p PAT-APPL-943 827
Supersedes PAT-APPL-943 827-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

According to the present invention, coal combustion gas is the primary working fluid and copper or a copper alloy is the electrodynamic fluid in the MHD generator, thereby eliminating the heat exchangers between the combustor and the liquid-metal MHD working fluids, allowing the use of a conventional coalfired steam bottoming plant, and making the plant simpler, more efficient and cheaper. In operation, the gas and liquid are combined in a mixer and the resulting two-phase mixture enters the MHD generator. The MHD generator acts as a turbine and electric generator in one unit wherein the gas expands, drives the liquid across the magnetic field and thus generates electrical power. The gas and liquid are separated, and the available energy in the gas is recovered before the gas is exhausted to the atmosphere. Where the combustion gas contains sulfur, oxygen is bubbled through a side loop to remove sulfur therefrom as a concentrated stream of sulfur dioxide. The combustor is operated substoichiometrically to control the oxide level in the copper. (ERA citation 05:030786)

PATENT-4 205 235
Not available NTIS
Department of the Navy Washington DC
Automatic Electrical Load Matching Device for Wind Generators.
Patent,
Dharam Pal, Kwang T. Huang, and Maurice N. Smith. Filed 6 Mar 78, patented 27 May 80, 6p AD-D007 398/1, PAT-APPL-884 075
Supersedes PAT-APPL-884 075-78, AD-D005 056.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An automatic electrical load matching device for applying loads to wind driven generators. The device switches five different loads to the output of a wind driven generator. Each load corresponds to a range of speeds of the wind driven generator's rotor. (Author)

PB80-205693 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Drafting Test Methods for Photovoltaic Systems,
William F. Lankford, and Harry A. Schafft. Jun 80, 20p NBSIR-80-2060
Contract DOE-EG-77-C-1-4042
Sponsored in part by Solar Energy Research Inst., Golden, CO.

General guidance and a step-by-step procedure are provided as aids in the development of initial drafts of test methods for photovoltaic energy components and systems. It is intended that these drafts will be referred to the appropriate technical committees of organizations writing voluntary consensus standards. This approach is designed to facilitate the expeditious development of consensus test method standards for photovoltaic systems. The procedure is therefore designed to be compatible with the requirements of existing standards organizations.

PB80-207772 PC **A12**/MF **A01**
New York State Energy Research and Development Authority, Albany.
Small Hydroelectric Project Manual for Appalachian New York.
Mar 80, 259p ARC-78-202/CO-6520
Grant ARC-78-202/CO-6520
Prepared in cooperation with Gibbs and Hill, Inc., New York.

A major New York State energy goal is reducing dependence on expensive, imported oil. Throughout the Appalachian Region of New York State there are existing dam sites that have potential for development as small/low-head hydroelectric generating plants. These hydroelectric sites include those with abandoned generating facilities as well as those which were constructed for purposes such as flood control, navigation, and water storage. To encourage and assist efforts to develop these sites, this manual has been prepared to help identify those sites that have potential for hydroelectric power generation and to provide guidelines for the performance of preliminary feasibility assessments of the sites. The manual guidelines will assist municipal officials, planners, and others who do not have hydroelectrical engineering backgrounds in estimating the generating capacities and approximate power generating costs of small hydroelectric power installations. Legal, regulatory, and institutional issues affecting small hydroelectric power facilities have also been identified, and discussions of various approaches to these problems are included.

10C. Energy Storage

AD-A086 891/9 PC **A02**/MF **A01**
Oxford Univ (England) Inorganic Chemistry Lab
Phase Relationships in the Ambient Temperature Li sub x V sub 20 sub 5 System (x is greater than 0.1, x is less than 1.0),
P. G. Dickens, S. J. French, A. T. Hight, and M. F. Pye. 7 Aug 79, 6p AFOSR-TR-80-0497
Grant AFOSR-77-3402
Pub. in Materials Research Bulletin, v14 n10 p1259-1299 1979.

No abstract available.

AD-A086 921/4 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Strategies for Inorganic Research on Electrical-Energy-Storage Systems,
E. J. Casey. 1978, 6p Rept no. DREO-794
Presented at the Symposium on Strategies for Inorganic Research in Canada, Jun 78.
Availability: Pub. in Chemistry in Canada, v31 n1 p28-33 Jan 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 992/5 PC **A04**/MF **A01**
GTE Labs Inc Waltham MA
Investigation of Methods to Eliminate Voltage Delay in Li/SOCl2 Cells.
Final rept. 19 Sep 78-19 Sep 79,
Carl Schlaikjer, Clifton A. Young, and Marc Dobrusin. May 80, 75p DELET-TR-78-0558-1F
Contract DAAB07-78-C-0558

A comparative study of thionyl chloride electrolytes containing LiAlCl4, Li2B10Cl10, or Li2B12Cl12 has been carried out by monitoring LiCl film growth on lithium samples stored in these electrolytes and by evaluating the startup and measuring the capacity of anode limited lithium/thionyl chloride cells. The film growth on lithium samples was monitored by galvanostatic pulse polarization, by weight gain analysis, and by examination under the scanning electron microscope. The film growth rate on lithium in Li2B10Cl10/SOCl2 was found to be comparable to that in pure SOCl2, about one tenth of that found in LiAlCl4/SOCl2. Storage for longer periods of time or higher temperatures caused thicker films to form. The polyhedral borate electrolyte produced smooth films on lithium with widely scattered crystals, instead of closely packed crystals as in LiAlCl4/SOCl2. Lithium/thionyl chloride cells containing Li2B10Cl10/SOCl2 started without delay at -20C, even after prolonged storage at elevated temperature. The polyhedral borate electrolyte also reduced self discharge by local cell reduction of the solvent against cell hardware connected to the anode.

AD-A087 076/6 PC **A08**/MF **A01**
AVCO Systems Div Wilmington MA
High Energy Density Composite Flywheel Program.
Final rept. Jun 76-May 80 on Phase 2,
A. D. Sapowith, A. L. Gurson, and J. A. McElman. 30 May 80, 155p Rept no. AVSD-0170-80-RR
Contract DAAG53-75-C-0269

A bi-directional composite flywheel was instrumented with strain gages and tested to destruction. The flywheel was designed to exhibit constant stress in both radial and circumferential directions for all radial positions. Strain gage data verified this design. The burst speed was 38,741 rpm representing a specific energy level of 32.3 Wh/lb. The flywheel was constructed of Kevlar composite, had an outside diameter of 19.5 in., an axial thickness of 1.5 in and weighed 18.6 lbs. Premature failure was initiated at the inside diameter by excessive pressure exerted by a metal hub. A polyarylate hub design, with test data, is presented to solve this problem. (Author)

PATENT-4 184 018 Not available NTIS
Department of the Navy Washington DC
Non-Flashing Electrolyte for Use with Calcium Anode.
Patent,
Aaron N. Fletcher, Charles D. Stanifer, and Dan E. Bliss. Filed 5 Feb 79, patented 15 Jan 80, 2p AD-D007 409/6, PAT-APPL-6-008 998
Supersedes PAT-APPL-6-008 998, AD-D005 826.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electrolyte for use in a thermal battery with a calcium anode. A mixture in which the positive ions are 20 to 30 mole percent K+ and the remainder Li+ and in which the negative ions are about 87.5 mole percent nitrate and the remainder chloride is non-flashing with a calcium anode, and calcium ions are permitted to move through the passivating CaO layer that forms on the anode. (Author)

PATENT-4 189 827
Not available NTIS
Department of Energy, Washington, DC.
Treatment of Electrochemical Cell Components with Lithium Tetrachloroaluminate (LiAlCl/sub 4/) to Promote Electrolyte Wetting.
Patent,
J. G. Eberhart, and J. E. Battles. Filed 3 Nov 78, patented 26 Feb 80, 6p PAT-APPL-957 619
Supersedes PAT-APPL-957 619-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Electrochemical cell components such as interelectrode separators, retaining screens, and current collectors are contacted with lithium tetrachloroaluminate prior to contact with molten electrolytic salt to improve electrolyte wetting. The LiAlCl sub 4 can be applied in powdered, molten, or solution form; but, since this material has a lower melting point than the electrolytic salt used in high-temperature cells, the powdered LiAlCl sub 4 forms a molten flux prior to contact by the molten electrolyte when both materials are initially provided in solid form. Components of materials such as boron nitride and other materials that are difficult to wet with molten salts are advantageously treated by this process. (ERA citation 05:030744)

PATENT-4 190 950
Not available NTIS
Department of Energy, Washington, DC.
Dye-Sensitized Solar Cells.
Patent,
T. A. Skotheim. Filed 24 Mar 78, patented 4 Mar 80, 6p PAT-APPL-889 688
Supersedes PAT-APPL-889 688-78.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A low-cost dye-sensitized Schottky barrier solar cell is described comprised of a substrate of semiconductor with an ohmic contact on one face, a sensitizing dye adsorbed onto the opposite face of the semiconductor, a transparent thin-film layer of a reducing agent over the dye, and a thin-film layer of metal over the reducing agent. The ohmic contact and metal layer constitute electrodes for connection to an external circuit and one or the other or both are made transparent to permit light to penetrate to the dye and be absorbed therein for generating electric current. The semiconductor material chosen to be the substrate is one having a wide bandgap and which therefore is transparent; the dye selected is one having a ground state within the bandgap of the semiconductor to generate carriers in the semiconductor, and a first excited state above the conduction band edge of the semiconductor to readily conduct electrons from the dye to the semiconductor; the reducing agent selected is one having a ground state above the ground state of the sensitizer to provide a plentiful source of electrons to the dye during current generation and thereby enhance the generation; and the metal for the thin-film layer of metal is selected to have a Fermi level in the vicinity of or above the ground state of the reducing agent to thereby amply supply electrons to the reducing agent. (ERA citation 05:030399)

PATENT-4 200 686 Not available NTIS

Department of the Navy Washington DC
High Energy Density Thermal Cell.
Patent,
Aaron N. Fletcher. Filed 5 Feb 79, patented 29 Apr 80, 3p AD-D007 406/2, PAT-APPL-6-009 038
Supersedes PAT-APPL-6-009 038, AD-D005 827.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A thermal battery using a calcium anode and a catholyte consisting of a mixture of lithium, potassium, nitrate and chloride ions. The device is operable over a temperature range of about 150 C. to 600 C. and produces a long lasting, high energy density output. (Author)

11. MATERIALS

11B. Ceramics, Refractories, and Glasses

PAT-APPL-6-061 166 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Method for Introduction of Gases into Microspheres.
Patent Application,
C. D. Hendricks, J. C. Koo, and A. Rosencwaig.
Filed 26 Jul 79, 32p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is described for producing small hollow glass spheres filled with a gas by introduction of the gas during formation of the hollow glass spheres. Hollow glass microspheres having a diameter up to about 500 mu with both thin walls (0.5 to 4/sub mu /) and thick walls (5 to 20/sub mu /) that contain various fill gases, such as Ar, Kr, Xe, Br, D, H sub 2 , DT, He, N sub 2 , Ne, CO sub 2 , etc., in the interior thereof, can be produced by the diffusion of the fill gas or gases into the microsphere during the formation thereof from a liquid droplet of glass-form-forming solution. This is accomplished by filling at least a portion of the multiple-zone drop-furnace used in producing hollow microspheres with the gas or gases of interest, and then taking advantage of the high rate of gaseous diffusion of the fill gas through the wall of the gel membrane before it transforms into a glass microsphere as it is processed in the multiple-zone furnace. (ERA citation 05:030338)

11C. Coating, Colorants, and Finishes

AD-A087 374/5 PC **A03**/MF **A01**
Louisiana State Univ Baton Rouge Div of Engineering Research
Environmental Fate of Organotin Antifoulants: Chemical Speciation of Toxicants in Aqueous Solutions.
Technical rept.,
C. P. Monaghan, V. I. Kulkarni, M. Ozcan, and Mary L. Good. 22 Jul 80, 31p Rept no. TR-2
Contract N00014-79-C-0487
Prepared in cooperation with New Orleans Univ., LA., Dept. of Chemistry.

Organotin compounds of the type (n-C(4)H(9)(3)SnY are presently used as toxicants in marine antifouling coatings and the analogous triphenyltin compounds are known to be effective antifoulants. Although the coating matrix is thought to control the release of toxicant from the coating to the seawater environment, little definitive information is available on the chemical degradation of the toxicants in aqueous solution. To investigate these reactions, a variety of triphenyltin and tributyltin compounds were suspended in distilled water and artificial seawater, and the dissolved components were recovered by extraction with chloroform. Residues recovered from the chloroform extracts were examined using thin layer chromatography and infrared spectroscopy. (n-C(4)H(9))(3)Sn- was the only organotin structural unit found in the chloroform extracts of tributyltin suspensions, but several different units were found in the residues of the extracts of triphenyltin suspensions. Structures such as R(3)SnOH and R(3)SnOSnR(3) can be eliminated as possible soluble species since O-H and Sn-O-Sn stretching vibrations were absent in the infrared spectra of the residues of the chloroform extracts. (Author)

11D. Composite Materials

AD-A087 104/6 PC **A05**/MF **A01**
Connecticut Univ Storrs
Fatigue Behavior of Glass Fiber Reinforced Polybutyleneterephthalate.
Final rept. May 78-Apr 79,
A. T. DiBenetto. Apr 80, 77p AMMRC-TR-80-17
Contract DAAG46-78-C-0027

The fatigue behavior of short glass fiber reinforced PBT composites has been investigated under different environmental conditions. Exposure to water at high temperature causes embrittlement, while improved processing and exposure to high humidity cause an increase in ductility. The fatigue life is a function of the environmental conditioning, the stress level of the test and the ductility of the material. The quantity (Theta (max)/< Theta >)2 1n t(B) is independent of environmental conditioning and increases with increasing ductility. The total deformation-to-break during fatigue consists of a deformation attributable to cyclic softening and a longer term deformation that continues at nearly constant rate until failure occurs. The cyclic softening is associated with cyclic stress-strain characteristics, while longer term deformation is controlled by creep and microcavitational phenomena. Crack propagation rates in notched plates were measured. The crack propagation behavior was somewhat dependent on the stress history of the material.

AD-A087 367/9 PC **A08**/MF **A01**
Wyoming Univ Laramie Dept of Mechanical Engineering
Nonlinear Viscoelastic Behavior of a Composite Material Using a Finite Element Micromechanical Analysis.
Interim rept.,
Brent G. Schaffer, and Donald F. Adams. Jun 80, 156p UWME-DR-001-101-1, ARO-16370.1-MS
Contract DAAG29-79-C-0189

The analysis uses an elastoplastic finite element micromechanics computer program to model a unidirectional composite subjected to any combination of longitudinal, transverse, and hygrothermal loadings. Time-dependent effects are included by means of nonlinear viscoelastic constitutive equations. The method of solution is based upon the conditions for generalized plane strain which permits a pseudo-three-dimensional analysis. It also contains two failure criteria, viz., an octahedral shear stress criterion and a hydrostatic criterion. Application of load or changes in temperature or moisture are input through time-independent increments. A plotting package is also included which allows the user to obtain a total of eight different plots; octahedral shear stress and strain, maximum and minimum principal stress, in-plane shear stress, out-of-plane longitudinal stress, and normal and tangential shear stress on the fiber-matrix interface. The study demonstrates that the associated program is able to model essentially any type of stress input or hygrothermal history. (Author)

AD-A087 414/9 PC **A02**/MF **A01**
Akron Univ OH Inst of Polymer Science
Detachment of an Elastic Matrix from a Rigid Spherical Inclusion.
Technical rept.,
A. N. Gent. 1 Jul 80, 23p Rept no. TR-8
Contract N00014-76-C-0408

An approximate theoretical treatment is given for detachment of an elastomer from a rigid spherical inclusion by a tensile stress applied to the elastomeric matrix. The inclusion is assumed to have an initially-debonded patch on its surface and the conditions for growth of the patch are derived from fracture energy considerations. Catastrophic debonding is predicted to occur at a critical applied stress when the initial debond is small. The strain energy dissipated as result of this detachment, and hence the mechanical hysteresis, are also evaluated. When a reasonable value is adopted for Young's modulus (E) of the elastomeric matrix, it is found that detachment from small inclusions, of less than abut 0.1 mm in diameter, will not occur, even when the level of adhesion is relatively low. Instead, rupture of the matrix near the inclusion becomes the preferred mode of failure at an applied stress given approximately by E/2. For still smaller inclusions, of less than about 1 micrometer in diameter, rupture of the matrix becomes increasingly difficult, due to the increasing importance of a surface energy term. These considerations account for the general features of reinforcement of elastomers.

AD-A087 424/8 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Vibration of Thick Rectangular Plates of Bimodulus Composite Material.
Technical rept.,
C. W. Bert, J. N. Reddy, W. C. Chao, and V. S. Reddy. May 80, 30p Rept nos. OU-AMNE-80-8, TR-15
Contract N00014-78-C-0647

A finite-element analysis is carried out for small-amplitude free vibration of laminated, anisotropic, rectangular plates having arbitrary boundary conditions, finite thickness-shear moduli, rotatory inertia, and bimodulus action (different elastic properties depending upon whether the fiber-direction strain is tensile or compressive). The element has five degrees of freedom, three displacements and two slope functions, per node. An exact closed-form solution is also presented for the special case of freely supported single-layer orthotropic and two-layer, cross-ply plates. This provides benchmarks to evaluate the validity of the finite-element analysis. Both solutions are compared with numerical results existing in the literature for special cases (all for ordinary, not bimodulus, materials) and good agreement is obtained. (Author)

AD-A087 425/5 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Thermal Bending of Thick Rectangular Plates of Bimodulus Composite Material.
Technical rept.,
J. N. Reddy, C. W. Bert, Y. S. Hsu, and V. S. Reddy. Jun 80, 32p Rept nos. OU-AMNE-80-9, TR-16
Contract N00014-78-c-0647

Closed-form and finite-element solutions are presented for thermal bending and stretching of laminated composite plates. The material of each layer is assumed to be elastically and thermoelastically orthotropic and bimodular, i.e., having different properties depending upon whether the fiber-direction normal strain is tensile or compressive. The formulations are based on the thermoelastic version of the Whitney-Pagano laminated plate theory, which includes thickness shear deformations. Numerical results are obtained for deflections and neutral-surface positions associated with normal strains in both of the in-plane coordinates. The closed-form and finite-element results are found to be in good agreement. (Author)

AD-A087 429/7 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Thermoelasticity of Circular Cylindrical Shells Laminated of Bimodulus Composite Materials.
Technical rept.,
Y. S. Hsu, J. N. Reddy, and C. W. Bert. Jul 80, 38p Rept nos. OU-AMNE-80-14, TR-17
Contract N00014-78-c-0647

Closed-form and finite-element solutions are presented for the thermoelastic behavior of laminated composite shells. The material of each layer is assumed to be thermoelastically orthotropic and bimodular, i.e., having different properties depending upon whether the fiber-direction normal strain is tensile or compressive. The formulations are based on the thermoelastic generalization of Dong and Tso's laminated shell theory, which includes thickness shear deformations. The finite element used here has five degrees of freedom per node (three displacements and two bending slopes). Numerical results are presented for deflections and the positions of the neutral surfaces associated with bending along both coordinate directions. The closed-form and finite-element results are found to be in good agreement. (Author)

11E. Fibers and Textiles

AD-A087 030/3 PC **A03**/MF **A01**
Union Carbide Corp Parma OH Carbon Products Div
Activated Carbon Fabric from Pitch.
Final rept. 15 Jun 78-14 Sep 79,
S. M. Boszor. Jun 80, 37p PR-79-562, NATICK-TR-80/015, CE/MEL-214
Contract DAAK60-78-C-0053

A project was undertaken to determine whether pitch-based carbon cloth could be made into an active cloth suitable for clothing protective against hazardous chemical environments. The experiments involved activating pitch-based cloth by standard methods in steam and CO2 in a laboratory reactor. Cloth with sorptivities exceeding 50% CCl4 by weight, surface areas exceeding 800 sq m/gm, and breaking strengths exceeding 5 kg per 25 mm wide strip were produced. Conditions were optimized to produce cloth of the highest area sorptivities for NARADCOM evaluation. (Author)

11F. Metallurgy and Metallography

AD-A086 972/7 MF **A01**
Vought Corp Sterling Heights MI Michigan Div
Process Development--Tungsten Hemispheres.
Final rept.
Apr 80, 60p
Contract DAAK10-79-C-0049
Prepared in cooperation with Kennametal Corp., Latrobe, PA and Teledyne Firth Sterling, Nashville, TN.
Availability: Microfiche copies only.

This report presents the summary of activities conducted to develop two separate sintering processes from two tungsten manufacturers that have years of experience and expertise in the field of tungsten powder metallurgy. The objectives of this development program was to: (1) Lower the scrap rate due to cracking to 1 - 2%; (2) Improve material quality (reduce or eliminate porosity); (3) Develop an 'as sintered' product that had a ductility of 25%; (4) Produce an 'as sintered' tungsten disc with a collar i.e., eliminate the fragment lines near the outer edge of the disc; and (5) Qualify two heavy metal suppliers of tungsten discs for follow-on large quantity production.

AD-A086 979/2 PC **A03**/MF **A01**
Southern Univ Baton Rouge LA Dept of Mechanical Engineering
An Investigation of Mechanisms Effecting Environmental Stress Cracking in Titanium Alloy,
Ira J. Graham. 3 Apr 80, 31p
Contract N00019-79-C-0137

The acoustic emission technique was applied to monitor visible crack growth and microcrack formations as energy release in real time in titanium alloy using a 12.8 mm (0.510 in) WOL compact specimen in a plane strain mode. The specimens were fatigued in the 30 - 60 Hz range at a determined stress intensity factor (K sub I) with an acoustic emission transducer at a gain of 85 dB and a bandpass frequency of 0.1 - 0.3 MHz. A stable crack advanced and microcracks formed at angles other than parallel to the advancing stable crack as intermittent energy bursts in or along the boundaries of the grains. The energy release, referred to as 'acoustic emission', is a kind of elastic stress impulse. Crack movement in the order of magnitude million in/cyl were detected. Determination was made of the subcritical stress intensity factor (K sub sc) where the amplitude of the fatigue cycles no longer provide the energy source large enough to cause the crack to advance. (Author)

AD-A087 100/4 PC **A03**/MF **A01**
Michigan Technological Univ Houghton Dept of Metallurgical Engineering
Deformation of an Alloy with a Lamellar Microstructure: Experimental.
Technical rept.,
K. S. Chan, C. C. Wojcik, and D. A. Koss. May 80, 34p Rept no. TR-12
Contract N00014-76-C-0037, Grant AFOSR-74-2596

The deformation behavior of individual Widmanstatten colonies comprised of aligned lamellae of ductile phases has been investigated. Based on the alpha-beta Ti alloy, Ti-8Al-1Mo-1V, this study shows the existence of a large (>2X) variation in the critical resolved shear stress for yielding of individual colonies. Schmid's Law is not obeyed except for prism slip parallel to the beta lamellae. In addition, colonies with a high yield stress exhibit a high work hardening rate and fine, uniform slip, while colonies with a low yield stress deform by planar, non-uniform slip. This behavior appears to be independent of, slip system (basal, prism, or pyramidal) and of microstructure alpha-beta vs. alpha-alpha' (martensite)). The experimental behavior is correlated to several colony orientation parameters including the: stress axis, slip plane, slip direction, and orientation of the alpha-beta interface. The yield stress of a colony is found to increase as the slip direction of the dominant macroscopic slip plane tends toward being normal to the alpha-beta interface. These results indicate that the macroscopic flow behavior of colonies comprised of ductile lamellae depends on the ability of a slip system, once activated in the softer phase, to shear through the harder phase. The data also indicates that the interaction stresses at the phase interfaces are not a principle factor controlling macroscopic yielding. Finally, the alignment of a slip system in the alpha-phase with a potential slip system in the beta-phase lamellae does not appear to affect the yield stress strongly. (Author)

AD-A087 128/5 PC **A02**/MF **A01**
Michigan Technological Univ Houghton Dept of Metallurgical Engineering
On Crack Propagation Along Crystallographic Slip Bands.
Technical rept.,
K. S. Chan, and D. A. Koss. Jun 80, 8p Rept no. TR-13
Contract N00014-76-C-0037
Presented at the Acta/Scripta Metallurgica Conference on Dislocation Modeling, Gainesville, Florida, 22-27 Jun 80.

The influence of the crystallography of slip (fcc, hcp, and bcc) on crack propagation along planar slip bands is examined for two different inclined-crack configurations. If a crack propagates along a slip band and the Burger's vector of slip within that band is contained in the plane of the crack, (i.e., coplanar slip), then non-coplanar slip is hindered and large normal stresses develop near the crack-tip even for inclined cracks. The magnitude of these normal stresses is largest for basal plane cracking in a hcp material. However, the calculations show that the magnitude of the plastic constraint factor even for an inclined crack in fcc and bcc alloys fracturing along crystallographic slip bands is also large and comparable to a mode I crack in a polycrystalline material. The combination of the intense shear caused by the planar slip and the large normal stresses should result in easy crack propagation across individual grains and could result in a susceptibility to hydrogen embrittlement. (Author)

AD-A087 215/0 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Observations on the Generality of the Grain-Size Effect on Fatigue Crack Growth in Alpha Plus Beta Titanium Alloys.
Final rept.,
G. R. Yoder, L. A. Cooley, and T. W. Crooker. 19 May 80, 14p NRL-MR-4232, AD-E000 479

Results obtained through analysis of the literature agree with those of our own as regards the effect of grain size (l) on region-II fatigue crack growth rates (da/dN) of alpha + beta titanium alloys in ambient air, viz. that for a given value of stress-intensity range (delta kappa), da/dN decreases as (l) is increased. The analysis indicates that when microstructural modification of a given alloy affects a reduction in da/dN, the reduction appears attributable to an increase in (l); conversely, when microstructural modification fails to affect a significant change in da/dN, the result appears attributable to a negligible change in (l). Comparison of fatigue crack growth behavior at stress-intensity ranges of 15, 21 and 40 MPa square root m indicates a diminution of the grain-size effect with increased delta kappa. As elucidated in terms of the reversed plastic zone size model, diminution of the grain-size effect follows as a consequence of the reduced portion of the structure-sensitive mode of crack growth present as delta kappa is increased.

AD-A087 305/9 PC **A06**/MF **A01**
Massachusetts Inst of Tech Cambridge Corrosion Lab
Hydrogen Induced Intergranular Cracking of Nickel-Base Alloys.
Technical rept.,
M. Kurkela, T. S. F. Lee, and R. M. Latanision. Jul 80, 107p Rept no. TR-4
Contract N00014-78-C-0002
See also AD-A062 024.

This report is intended to summarize the activities pursued during the second year of a program directed toward an evaluation of the susceptibility of nickel and nickel base alloys to embrittlement by cathodically produced hydrogen. (Author)

AD-A087 347/1 PC **A07**/MF **A01**
General Accounting Office Washington DC Energy and Minerals Div
Domestic Aluminum Resources: Dilemmas of Development. Volume I.
17 Jul 80, 146p Rept no. GAO/EMD-80-63-VOL-1
See also Volume 2, AD-A087 348.

This report provides an assessment of the nonbauxitic alumina and aluminum research and development trends in this country, and makes rec-

ommendations to redirect the Government's research assistance toward reducing the capital and energy costs associated with domestic aluminum manufacture. Unless the Government's aluminum research and development effort is refocused and revitalized in the context of other related policy decisions, its expenditures will come to naught, and increasing domestic demand for aluminum will be met by imports.

AD-A087 348/9 PC **A05**/MF **A01**
General Accounting Office Washington DC Energy and Minerals Div
Domestic Aluminum Resources: Dilemmas of Development. Volume II. Appendixes II-VII. Detailed Agency Comments and GAO Response.
17 Jul 80, 99p Rept no. GAO/EMD-80-63-VOL-2
Report to the Congress. See also Volume 1, AD-A087 347.

This is volume II of the report, which includes the comments from Federal agencies, aluminum companies, and academic advisers for the technical appendix contained in volume I, together with our response to the agency comments. The comments, as well as the report, concern major policy questions about U.S. resource development and industrial policy. The comments are frequently long and reflect a great deal of informed, deliberate thought. They also illustrate how technical data are influenced by subjective judgment and particular organizational perspective. This second volume illustrates that abstracted technical judgements may mask other considerations; that there is not one potential solution but numerous ones, depending on the definition of the research objective; and that the research objective for the miniplant program was changed to develop a nonbauxitic alumina technology rather than a process information matrix.

AD-A087 401/6 PC **A02**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Advanced Aluminum Alloys from Rapidly Solidified Powders.
Research and development status rept. 5 Mar-5 Jun 80,
R. E. Lewis. Jun 80, 15p Rept no. LMSC/D770654
Contract F33615-78-C-5203, DARPA Order-3417

Advanced aluminum alloys are to be developed that will provide major payoffs for important new aircraft, spacecraft, and missile systems in the next decade. Payoffs will result from weight savings of structural components which, in turn, lead to increased range, payload, service life, and decreased life-cycle cost. The objective of this program is to develop advanced aluminum alloys from rapidly solidified particulate that meet specific property goals. In addition, the program is to establish a metallurgical basis suitable for manufacturing scale-up and application to new weapon systems.

AD-A087 442/0 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Determination of Fatigue Damage.
Research and development rept.,
R. N. Pangborn, T. Tsakalakos, W. E. Mayo, S. Weissmann, and I. R. Kramer. Aug 80, 36p Rept no. DTNSRDC-80/093

The deformation response of polycrystalline AA2024-T4 to cyclic loading has been determined by conventional and double-crystal diffractometry. These studies show a preferential work-hardening near the surface compared to the bulk. The defect distribution as a function of depth was also investigated as a function of the fraction of fatigue life. From these studies, it was determined that the remaining fatigue life could be predicted by determining the average ratio beta/beta* where beta is the linewidth at any number of fatigue cycles and beta* is the critical linewidth at fracture. Current studies have shown these predictions to be valid for tests where the stress amplitude is held constant for the entire test. A few tests have also been performed where the loading sequence is more complicated. In these tests, the X-ray predictive method was found to be far more accurate than conventional methods. (Author)

INIS-mf-4315 PC **A05**/MF **A01**
Vienna Univ. (Austria).
Reactions of Stabilized Austenitic Stainless Steel in Liquid Sodium.
Thesis,
H. R. Konvicka. 1977, 100p
In German.
U.S. Sales Only.

TL. (Atomindex citation 09:404312)

PAT-APPL-6-068 358 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method for Cleaning Bomb-Reduced Uranium Derbies.
Patent Application,
J. G. Banker, H. L. Wigginton, D. E. Beck, and C. E. Holcombe. Filed 21 Aug 79, 10p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The concentration of carbon in uranium metal ingots induction cast from derbies prepared by the bomb-reduction of uranium tetrafluoride in the presence of magnesium is effectively reduced to less than 100 ppM by removing residual magnesium fluoride from the surface of the derbies prior to casting. This magnesium fluoride is removed from the derbies by immersing them in an alkali metal salt bath which reacts with and decomposes the magnesium fluoride. A water quenching operation followed by a warm nitric acid bath and a water rinse removes the residual salt and reaction products from the derbies. (ERA citation 05:030843)

PB80-205685 PC **A03**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Data Analysis Methods for Short Rod and Short Bar Fracture Toughness Tests of Metallic Materials,
L. M. Barker. Mar 80, 39p TR-80-12, NSF/RA-800078
Grant NSF-DAR78-820993

The behavior of short rod and short bar metallic specimens when measured for plane-strain fracture toughness is described. Such measurements are of increasing interest due to a simplicity of specimen design, small specimen size, automatic creation of a natural precrack without fatigue, and the accuracy and reproducibility of test results. The report describes four basic behavior types and the procedures used for data analysis. Most materials have a relatively smooth crack during testing, but some, including many steels, exhibit a jump behavior which requires a different procedure. Specimen geometry, test procedures, and data analysis methods combine to provide good measurements of the plane-strain fracture toughness even in the presence of macroscopic stresses and limited plasticity during the test. Criteria for judging the validity of test procedures are presented.

11I. Plastics

AD-A086 941/2 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Semiconducting and Metallic Covalent Polymers: (CH)X and Its Derivatives.
Interim technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 8 Jul 80, 13p Rept no. TR-80-5
Contract N00014-75-C-0962

polyacetylene, (CH)x, is the simplest possible conjugated organic polymer and is therefore of special fundamental interest. It can be prepared in the form of lustrous, silvery, flexible, polycrystalline films having any desired cis/trans content by catalytic polymerization of gaseous acetylene, C2H2. The cis-rich films can be stretched easily at room temperature in excess of three times their original length with concomitant partial alignment of the (CH)x fibrils. Dark red gels of toluene in (CH)x may be prepared using a lower catalyst concentration. Highly porous, very low density, 'foam-like' (CH)x can be obtained from these gels. Both cis- and trans-(CH)x are p-type semiconductors which can be treated with a variety of p- or n-type dopants with concomitant increase in conductivity to give a series of semiconductors and ultimately, 'organic metals'. This report will be directed primarily towards a description of the more chemically oriented aspects of (CH)x and its derivatives. (Author)

AD-A086 942/0 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Photoconductivity in Polyacetylene.
Interim technical rept.,
S. Etemad, M. Ozaki, D. L. Peebles, A. J. Heeger, and A. G. MacDiarmid. 8 Jul 80, 19p Rept no. LRSM-TR-80-6
Contracts N00014-75-C-0962, DE-AC04-79ET-23002

An extensive study of the photoconductivity together with new measurements of the absorption coefficient of polyacetylene have been carried out. It is shown that the photoconductivity in trans-(CH) sub x is controlled by localized states (inside the gap) induced either by isomerization or by dilute doping. The presence of such states and their effect on the photoconductivity of trans-(CH) sub x is accounted for by the recently proposed soliton model. (Author)

AD-A086 943/8 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Microwave Properties of Low Density (CH) sub x.
Technical rept.,
A. Feldblum, Y. W. Park, A. J. Heeger, A. G. MacDiarmid, and G. Wnek. 8 Jul 80, 22p Rept no. LRSM-TR-80-7
Contract N00014-75-C-0962
Prepared in cooperation with Massachusetts Univ., Amherst. Dept. of Polymer Science.

The results of an initial study of the microwave properties of low density foam-like (CH) sub x are reported for intermediate dopant levels. The electrical conductivity and dielectric constant are obtained at microwave frequencies, and the results are analyzed in terms of effective medium theory. The possibility of utilizing the doped foam-like (CH) sub x as an efficient microwave absorber is discussed. (Author)

AD-A086 978/4 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Magnetic Soliton Defects in Polyacetylene.
Interim technical rept.,
B. R. Weinberger, E. Ehrenfreund, J. Kaufer, A. Pron, and A. J. Heeger. 8 Jul 80, 19p Rept no. TR-80-1
Contract N00014-75-C-0962

Magnetic resonance studies of undoped polyacetylene indicate a mobile defect induced upon isomerization to the trans-isomer. The unpaired spin in the pi-system is spread over approximately fourteen carbon atoms. The results are in all respects consistent with the soliton model. (Author)

AD-A087 026/1 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Electron Spin Resonance Studies of Magnetic Soliton Defects in Polyacetylene.
Technical rept.,
B. R. Weinberger, E. Ehrenfreund, A. Pron, A. J. Heeger, and A. G. MacDiarmid. 23 Nov 79, 13p Rept no. LRSM-TR-80-2
Contract N00014-75-C-0962
Pub. in Jnl. of Chemical Physics, v72 n9 p4749-4755, 1 May 80.

No abstract available.

AD-A087 054/3 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Organic Metals and Semiconductors: The Chemistry of Polyacetylene, (CH)x, and Its Derivatives.
Interim technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 24 Nov 79, 13p Rept no. TR-79-11
Contract N00014-75-C-0962
Presented at the International Congress of Quantum Chemistry (3rd), Kyoto (Japan) Oct 79.

Polyacetylene is quite remarkable in that its conductivity can be readily modified to spand an extraordinarily large range. Considering possible polyacetylene derivatives, replacement of some or all of the hydrogen atoms in polyacetylene with organic or inorganic groups, copolymerization of acetylene with other acetylenes or olefins, and the use of different dopants should lead to the development of a large new class of conducting organic polymers with electrical properties that can be controlled over the full range from insulator to semiconductor to metal. Furthermore, there is considerable potential for the possible application of a parent or doped polyacetylene to the fabrication of various types of electronic devices, solar cells, etc.

AD-A087 106/1 PC **A06**/MF **A01**
Coast Guard Research and Development Center Groton CT
The Dynamic Behavior of Nylon and Polyester Line.
Final rept.,
Kenneth R. Bitting. Apr 80, 115p CGR/DC-9/79, USCG-D-39-80

A series of tests were conducted to determine the dynamic response of nylon and polyester, double-braided and 8-strand plaited line. Line samples were excited mechanically in a tensile testing machine according to an experimental design in which frequency of excitation, mean load, and load amplitude were varied. The dynamic stiffness, called the apparent spring constant, was measured. Results indicate that the apparent spring constant is 3 to 4 times greater than the static elasticity. Samples of nylon and polyester line were placed in the ocean for 4 to 5 years and then tested with the same dynamic test procedure as was previously performed on the new line samples. The apparent spring constant of nylon double-braided line approximately doubled after five years of exposure to the marine environment, and polyester 8-strand plaited and double-braided line increased about 10 to 25 percent. The increase in dynamic stiffness with age will result in an increase in tension for a given displacement. Snap load tests were conducted on nylon 8-strand plaited line (snap load is a cyclic loading in which zero is the minimum tension) and it was found that samples failed from fatigue when the maximum load exceeds 30 percent of the rated breaking strength. Samples do not fail by 200,000 cycles if the maximum load does not exceed 30 percent. Field and laboratory abrasion tests were also conducted on nylon, polyester, and polypropylene line of the 8-strand plaited, double-braided, and 3-strand twisted constructions. Some samples were jacketed with polyurethane and the abrasion resistance was increased by approximately 5 to 6 times. (Author)

AD-A087 139/2 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Synthesis, Structure, and Electrical Properties of Doped Polyacetylene,
C. K. Chiang, A. J. Heeger, and A. G. MacDiarmid. 1979, 16p Rept no. TR-79-2
Contract N00014-75-C-0962
Pub. in Berichte der Bunsengesellschaft fuer Physikalische Chemie, v83 p407-417 1979.

No abstract available.

AD-A087 140/0 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Donor and Acceptor States in Lightly Doped Polyacetylene, (CH)x.
Technical rept.,
C. R. Fincher, Jr., M. Ozaki, A. J. Heeger, and A. G. MacDiarmid. 29 Nov 78, 14p Rept no. TR-79-3
Contract N00014-75-C-0962
Pub. in Physical Review B, v19 n8 p4140-4148, 15 Apr 79.

No abstract available.

AD-A087 142/6 PC **A04**/MF **A01**
Princeton Univ NJ Dept of Chemical Engineering
A Review of Approaches to the Study of Cavitation Inhibition by Means of Polymer Additives.
Technical rept. 15 Apr-Nov 79,
William R. Schowalter, and Stuart K. Hara. 14 Jul 80, 69p Rept no. 160-6076-1
Contract N00014-79-C-0385

A review of topics relevant to Newtonian and non-Newtonian bubble and droplet dynamics, together with an extensive bibliography, are presented. This review forms the basis for an assessment of theoretical and experimental studies of nonspherical bubble growth and collapse in non-Newtonian fluids. In the report, which is adapted from a proposition for a research dissertation, we show the difference between extremes of inertia-dominated and viscosity-dominated bubble dynamics under conditions of interest. Comparison with published data shows that the effect of inertia is expected to be important, even in non-Newtonian systems. Finally, the goals of the research are delineated, and possible theoretical and experimental approaches are outlined. (Author)

AD-A087 289/5 PC **A04**/MF **A01**
Pennsylvania Univ Philadelphia
Electrical Transport in Doped Polyacetylene.
Technical rept.,
Y. -W. Park, A. J. Heeger, M. A. Druy, and A. G. MacDiarmid. 8 Jul 80, 59p Rept no. TR-80-4
Contract N00014-75-C-0962, Grant NSF-DMR76-80994

The results of an experimental study of electrical conductivity and thermopower in doped polyacetylene are reported. Included are measurements on both as-grown and partially oriented films doped with iodine and AsF6; (CH(AsF5)sub y)sub x and (CH(I3)sub y)sub x where y covers the full doping range. The data indicate three important concentration regimes; the dilute limit ($y<0.001$), the transitional region ($0.001<y<0.01$), and the metallic state ($y>0.01$).

11J. Rubbers

AD-A087 284/6 PC **A04**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg
Formation and Failure of Elastomer Networks via Thermal, Mechanical and Surface Characterization.
Final technical rept. 24 Aug 78-30 Jun 80,
David W. Dwight, and James E. McGrath. Dec 79, 61p TARADCOM-12498
Contract DAAK30-78-C-0098

This work focussed upon development of ESCA, SEM/EDAX, TGA, DSC and TMA methodologies for synthetic elastomer compounds typically used in tank track pad service by the U. S. Army. The initial goal was to develop a molecular model of the failure mechanisms that lead to costly pad replacement. Exploratory measurements were conducted on fully compounded, uncured rubber, and pre-and post-service track pads. Studied also were laboratory-prepared samples involving variable matrix (SBR, EPDM and 50/50 SBR/BR) as well as zinc oxide particle shape and size. An initial data base has been accumulated with surface and thermo-mechanical analysis that could provide useful structure-property information for further research and development of engineering elastomers.

11L. Wood and Paper Products

PB80-207137 PC **A13**/MF **A01**
Forintek Canada Corp., Vancouver (British Columbia). Western Forest Products Lab.
Proceedings of the International Conference on Wood Fracture (1st) Held at Banff, Alberta on 14-16 August 1978.
Jul 79, 278p ISBN-0-86488-014-6

Partial contents:
- On the application of brittle fracture theory, fracture mechanics and creep-rupture models for the prediction of the reliability of wood structure elements;
- Mathematical model of the tension behavior of wood with knots and cross grain;
- Evaluation of long-term bearing capacity of wood structures by their performance under short-term loading;
- Effect of transverse stress on the shear strength and failure mechanism of Douglas-fir;
- A model for fracture toughness of oriented flakeboard;
- Size effects in lumber for bending;
- Time-strength relationship for lumber;
- Climatic stresses of wooden construction elements;
- Crack failure of dead, ramp- and combined-loaded viscoelastic materials.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A086 893/5 PC **A02**/MF **A01**
California Univ Santa Barbara Inst for Algebra and Combinatorics
An Asymptotic Solution of the Multidimensional Dimer Problem,
Henryk Minc. 25 Oct 78, 8p AFOSR-TR-80-0437
Contract F49620-78-C-0030
Pub. in Linear and Multilinear Algebra, v8 p235-239 1980.

No abstract available.

AD-A086 905/7 PC **A02**/MF **A01**
California Univ Berkeley Electronics Research Lab
Adaptive Control of Markov Chains. I. Finite Parameter Set,
V. Borkar, and P. Varaiya. 5 Mar 79, 6p AFOSR-TR-80-0521
Contract F44620-76-C-0100, Grant NSF-ENG76-16816
Pub. in IEEE Transactions on Automatic Control, vAC-24 n6

No abstract available.

AD-A086 907/3 PC **A02**/MF **A01**
California Univ Berkeley Electronics Research Lab
Foundations of Feedback Theory for Nonlinear Dynamical Systems,
Charles A. Desoer, and Yung-Terng Wang. 30 Oct 78, 21p AFOSR-TR-80-0526
Contract F44620-76-C-0100
Pub. in IEEE Transactions on Circuits and Systems, vCAS27 n2 p104-123 Feb 80.

No abstract available.

AD-A086 916/4 PC **A06**/MF **A01**
Stanford Univ CA Dept of Computer Science
Formalizing the Analysis of Algorithms.
Doctoral thesis,
Lyle Harold Ramshaw. Jun 79, 122p Rept no. STAN-CS-79-741
Contract N00014-76-C-0330, Grant NSF-MCS77-23738
Also available as Xerox Palo Alto Research Center, Technical Rept. no. CSL-79-5.

Consider the average case analyses of particular deterministic algorithms. Typical arguments in this area can be divided into two phases. First, by using knowledge about what it means to execute a program, an analyst characterizes the probability distribution of the performance parameter of interest by means of some mathematical construct, often a recurrence relation. In the second phase, the solution of this recurrence is studied by purely mathematical techniques. The goal is to build a formal

system in which the first phases of these arguments can be reduced to symbol manipulation. Formal systems currently exist in which one can reason about the correctness of programs by manipulating predicates that describe the state of the executing process. The construction and use of such systems belongs to the field of program verification.

AD-A086 917/2 PC **A03**/MF **A01**
Colorado State Univ Fort Collins Dept of Statistics
Confidence Intervals on a Ratio of Variances in the Two-Factor Crossed Components of Variance Model.
Technical rept.,
Franklin A. Graybill, and Carmen E. Arteaga. 1 Jul 80, 44p Rept no. TR-5
Contract N00014-78-C-0463

No abstract available.

AD-A086 922/2 Not available NTIS
Technische Hogeschool Delft (Netherlands)
Optimal Low-Sensitivity Linear Feedback Systems (Systemes Lineaires a Reaction a Sensibilite Optimalement Faible) (Optimale Lineare Feedback Systeme Geringer Empfindlichkeit),
H. Kwakernaak. 17 Sep 86, 7p
Availability: Pub. in Automatica, v5 p279-285 1969 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 933/9 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Stochastic Sequential Input Adaptive System Theory.
Journal article Jan-May 79,
David E. Greene. 17 May 79, 7p Rept no. SAM-TR-79-370
Pub. in IEEE Transactions on Systems, Man and Cybernetics, vSMC-10 n4 p197-202 Apr 80.

No abstract available.

AD-A086 974/3 PC **A05**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Waves, Caustics and Thom's Theorem.
Doctoral thesis,
Arthur Daniel Gorman. 5 Mar 80, 89p Rept no. ARL/PSU/TM-80-26
Contract N00024-79-C-6043

The technique of Maslov for determining the first term in the asymptotic series solution of linear partial differential equation is extended to determine the full asymptotic series solution of the reduced Helmholtz equation for scalar waves propagated in an inhomogeneous medium. The algorithm requires the characterization of the medium by a canonical phase function determined from a criterion derived from Thom's classification of singularities. (Author)

AD-A087 005/5 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A Non-Recursive Incomplete Cholesky Decomposition Method for the Solution of Linear Equations with a Sparse Matrix.
Memorandum rept.,
A. Hain. 16 Jun 80, 26p NRL-MR-4264, AD-E000 482

The incomplete Cholesky decomposition and the subsequent iterative solution by the conjugate gradient method has been described recently by D. Kershaw. The drawback of a triangular decomposition on a vector machine is the need for recursive computations. This paper proposes a method which eliminates the need for recursive computations. They are replaced by a number of non-recursive operations. This method can be utilized in the solution of potential equations in late time electrostatic codes. (Author)

AD-A087 009/7 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Proceedings of Colloquium on Stable Solutions of Some Ill-Posed Problems, October 9, 1979.
Memorandum rept.,
A. G. Ramm, and Arthur K. Jordan. 30 Jun 80, 45p NRL-MR-4269, AD-E000 487

This report contains the proceedings of a colloquium at the Naval Research Laboratory which was based upon Professor Ramm's lecture at the International Symposium on Ill-posed Problems. Stable solutions of equations of the first kind and equations of the second kind at a characteristic value are given. Iterative processes for solutions are constructed. Extension of operators is used to make of an ill-posed problem a well-posed one. (Author)

AD-A087 014/7 PC **A04**/MF **A01**
Weizmann Inst of Science Rehovoth (Israel)
Quantitative Synthesis of Uncertain Multiple Input-Output Feedback System,
Isaac M. Horowitz. 31 Aug 79, 51p
Grant AFOSR-76-2946

There is given an n input, n output plant with a specified range of parameter uncertainty and specified tolerances on the n to the 2nd power system response to command functions and the n to the 2nd power response to disturbance functions. It is shown how Schauder's fixed point theorem may be used to generate a variety of synthesis techniques, for a large class of such plants. The design guarantees the specifications are satisfied over the range of parameter uncertainty. An attractive property is that design execution is that of successive single-loop designs, with no interaction between them and no iteration necessary. Stability over the range of parameter uncertainty is automatically included. By additional use of Schauder's theorem, these same synthesis techniques can be rigorously used for quantitative design in the same sense as above, for n x n uncertain nonlinear plants, even nonlinear time-varying plants, in response to a finite number of inputs. Latter approach sufficient. However, a scientific theory of feedback should certainly include quantitative design techniques. In this paper, it is shown how Schauder's fixed point theorem can be used to generate a variety of precise quantitative mio synthesis techniques suitable for various problem classes.

AD-A087 031/1 PC **A02**/MF **A01**
Wisconsin Univ-Madison Dept of Mathematics
Subharmonic Solutions of a Forced Wave Equation,
Paul H. Rabinowitz. Nov 79, 14p
Contract N00014-76-C-0300

In a recent paper, the existence of subharmonic solutions of forced Hamiltonian systems of ordinary differential equations was established. The goal of this note is to show that subharmonics also occur for a class of semilinear wave equations.

AD-A087 045/1 PC **A03**/MF **A01**
Purdue Univ Lafayette IN School of Industrial Engineering
Batch Size Effects in the Analysis of Simulation Output.
Technical rept.,
Bruce Schmeiser. Jun 80, 27p
Contract N00014-79-C-0832

This paper considers the effects of using fewer batches than are necessary to satisfy normality and independence assumptions. Using too few batches results in (1) correct probability of covering the mean, (2) an increase in expected half length, (3) an increase in the standard deviation of the half length, and (4) an increase in the probability of covering incorrect values of the mean (analogous to Type II error in hypothesis testing). These effects, quantified here, are shown to be small when at least eight to ten batches are used, with least effect on confidence intervals having low confidence values. With the effects of using too few batches quantified, a simulation practitioner can make the trade-off between the ease of using very few batches with known independence and normality versus using a batching algorithm to squeeze some remaining information from the data. For researchers developing batching algorithms, the results are useful in selecting initial batch sizes. The results may also be useful in the context of using independent replications to establish confidence intervals on the mean. Finally, some criteria and a procedure are suggested for Monte Carlo comparison of confidence interval procedures. These suggestions are not restricted to batch mean algorithms.

AD-A087 049/3 PC **A02**/MF **A01**
Arizona Univ Tucson
On Multiple Solutions of Singularly Perturbed Systems in the Conditionally Stable Case.
Technical rept.,
Robert E. O'Malley, Jr. Jul 80, 23p Rept no. 29
Contract N00014-76-C-0326
Presented at the Advanced Seminar on Singular Perturbations and Asymptotics, Mathematics Research Center, Madison, WI. 28-30 May 80.

This paper seeks the asymptotic behavior of solutions to nonlinear singularly perturbed boundary value problems for ordinary differential equations. Presuming a Jacobian matrix has a fixed number of (strictly) stable and unstable eigenvalues, the limiting solution can often be obtained from a reduced problem. Boundary layer behavior will satisfy a conditionally stable system, and multiple solutions will often result. The asymptotic structure of solutions is helpful in developing numerical solution schemes, and is vital in various applications (including some optimal control problems). (Author)

AD-A087 050/1 PC **A02**/MF **A01**
Arizona Univ Tucson
A Singular Perturbations Approach to Reduced-Order Modeling and Decoupling for Large-Scale Linear Systems.
Technical rept.,
Robert E. O'Malley, Jr. Jul 80, 11p Rept no. 28
Contract N00014-76-C-0326

This tutorial presentation introduces the two-time-scale concept and applies it to provide approximate solutions to initial-value problems for large-scale linear systems. (Author)

AD-A087 052/7 PC **A02**/MF **A01**
Colorado State Univ Fort Collins Dept of Statistics
'Exact' Two-Sided Confidence Intervals on Nonnegative Linear Combinations of Variances.
Technical rept.,
Franklin A. Graybill, and Chih-Ming Wang. 1 Jul 80, 20p Rept no. TR-4
Contract N00014-78-C-0463

A method is presented for obtaining two-sided confidence intervals on a nonnegative linear combination of two variances and the confidence coefficient is 'exact' (equal to a specified value 1-alpha). (Author)

AD-A087 057/6 PC **A02**/MF **A01**
Michigan State Univ East Lansing Dept of Statistics and Probability
Convergence of Progressively Censored Likelihood Ratio Processes in Life-Testing,
Joseph C. Gardiner. Jun 80, 19p Rept no. RM-391
Contract N00014-79-C-0522, Grant PHS-S07-RRO-7049

The weak convergence of certain (randomly stopped) likelihood ratio processes based on the ordered observations corresponding to a random sample is considered in the situation where the hazard rate function of the underlying distribution is separable in its variables. It is shown that under mild conditions on the stopping variables the log-likelihood function is locally asymptotically normal. Some remarks pertaining to the general ease and applications of the theorems proved are also discussed. (Author)

AD-A087 075/8 PC **A06**/MF **A01**
Tennessee Univ Knoxville Dept of Psychology
Estimation of the Operating Characteristics when the Test Information of the Old Test is not Constant. I. Rationale.
Research rept.,
Fumiko Samejima. 16 Jun 80, 105p Rept no. RR-80-2
Contract N00014-77-C-0360

Many combinations of a method and an approach for estimating the operating characteristics of the graded item responses, without assuming any mathematical forms, have been produced. In these methods, we need a set of items whose characteristics are known, or Old Test, which has a large, constant amount of test information throughout the interval of latent trait of our interest. In the present paper, the rationale is presented to gener-

alize these methods so that they are made applicable when the test information of the Old Test is not constant. Both the transformation-free character of the maximum likelihood estimator and the method of moments for fitting a polynomial as the least squares solution play important roles in this rationale. (Author)

AD-A087 078/2 PC **A02**/MF **A01**
Texas Univ At Austin Center for Cybernetic Studies
A Dual Algorithm to Solve Linear Least Absolute Value Approximations.
Research rept.,
Ronald Armstrong, and Mabel Kung. Jun 80, 19p
Rept no. CCS-RR-370
Contracts N00014-75-C-0569, N00014-80-C-0242

This paper presents a special purpose dual linear programming algorithm to solve linear least absolute value problems. In addition, strategies involving start procedures are examined. Implementations of computer-based techniques are discussed. Computational results with three computer code versions of the algorithm are given. (Author)

AD-A087 079/0 PC **A02**/MF **A01**
Texas Univ At Austin Center for Cybernetic Studies
On the Unimodality of High Convolutions.
Research rept.,
Patrick L. Brockett, and J. H. B. Kemperman. Jun 80, 20p Rept no. CCS-RR-372
Contract N00014-75-C-0569

It has been conjectured, for any discrete density function on the integers, that there exists an n sub o such that the n-fold convolution is unimodal for all n > or = n sub o. A similar conjecture has been stated for continuous densities. We present several counterexamples to both of these conjectures. As a positive result, it is shown for a discrete density with a connected 3-point integer support that its n-fold convolution is fully unimodal for all sufficiently large n.

AD-A087 111/1 PC **A09**/MF **A01**
Colorado State Univ Fort Collins Dept of Statistics
Testing for a Change Point.
Technical rept.,
Nancy Jean Farden. Apr 80, 182p Rept no. TR-19
Contract N00014-75-C-0518

A nonparametric procedure based on differences of averages is proposed to test for a change in the location parameter of the distribution for a sequence of independent random variables. we assume that at most one change may have occurred and that the point of change is an unknown parameter; the initial value of the location parameter is assumed known. The emphasis is on obtaining a method of testing for a change point for small sample sizes which is easy to use and which will detect a change quickly. Exact critical regions are tabulated for n < or = 20; the power of the tests and properties of the estimator for the change point are studied. Appropriate design of experiments for detecting change points are suggested. (Author)

AD-A087 117/8 PC **A02**/MF **A01**
Iowa Univ Iowa City Dept of Statistics
Bounds on Mixtures of Distributions Arising in Order Restricted Inference; (Distributional Bounds).
Technical rept.,
Tim Robertson, and F. T. Wright. 10 Jul 80, 22p
Rept no. 1
Contract N00014-80-C-0322
Prepared in cooperation with Missouri Univ-Rolla, Contract N00014-80-C-0321.

In testing hypotheses involving order restrictions on a collection of parameters, distributions arise which are mixtures of standard distributions. Since tractable expressions for the mixing proportions do not, in general, exist even for parameter collections of moderate size, the implementation of these tests may be difficult. It is not necessary to bound the individual mixing proportions in order to obtain a bound for the tail probabilities of the 'mixed' distributions. Bounds for such tail probabilities are derived and their application to several order restricted hypothesis testing situations is discussed. These results are also applied to obtain the least favorable configuration in a two sample likelihood ratio test of the equality of two multinomial populations versus a stochastic ordering alternative. (Author)

AD-A087 172/3 Not available NTIS
Rockwell International Thousand Oaks CA Science Center
Life-Test Sampling Plans for Two-Parameter Weibull Populations,
K. W. Fertig, and Nancy R. Mann. Mar 78, 13p
Contracts N00014-73-C-0474, N00014-76-C-0723
Supersedes AD-A056 846.
Availability: Pub. in Technometrics, v22 n2 p165-177 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A087 177/2 PC **A02**/MF **A01**
Rice Univ Houston TX Dept of Mechanical Engineering
Sequential Conjugate Gradient-Restoration Algorithm for Optimal Control Problems with Non-Differential Constraints and General Boundary Conditions. Part 1,
A. K. Wu, and A. Miele. 18 Oct 79, 23p AFOSR-TR-80-0508
Grant AFOSR-76-3075
Pub. in Optimal Control Applications and Methods, v1 n1 p69-88 1980.

No abstract available.

AD-A087 187/1 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Mathematics
Some Remarks on Reachability of Infinite-Dimensional Linear Systems.
Interim rept.,
Yutaka Yamamoto. Mar 79, 19p AFOSR-TR-80-0534
Grant AFOSR-76-3034

In this paper we shall be concerned with the question of reachability when allowing distribution inputs. We show that a certain class of systems accept distribution inputs, but, in general, they cannot be exactly reachable. We shall also consider the problem of the uniqueness of canonical realizations in relation to exact reachability, and show that Matsuo's result on uniqueness does not apply to the example given in Baras, Brockett, and Fuhrmann. (Author)

AD-A087 204/4 PC **A04**/MF **A01**
Kentucky Univ Lexington Dept of Electrical Engineering
Matrix Methods for Determining System Poles from Transient Response.
Electromagnetics research rept. 1 Sep 78-30 Apr 79,
T. L. Henderson. May 80, 55p Rept no. RR-80-1
Contract N00014-77-C-0362

The problem treated is that of identifying the poles of a finite order system by observing its transient decay after cessation of input, for a limited time, using (possibly) multiple observation points and experimental repetition. Various approaches are studied, having the common characteristic that a homogeneous matrix equation must be solved. Several techniques that have been given scant attention in the literature are consolidated into the treatment, together with new results including an analytical treatment of the consequences of assuming an excessively high system order, derivation of a statistically unbiased estimate for an intermediate parameter in the solution, new theorems on error effects, a recipe for effective use of the singular value decomposition, a new method for suppression of extraneous poles, an elucidating derivation and extension of the method of Jain, a new form of the problem wherein the system poles are eigenvalues, and a study of the relationship between various pole identification methods. (Author)

AD-A087 287/9 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Measurement Error in Regression Analysis.
Amitava Mitra, and Khursheed Alam. 8 May 78, 12p Rept nos. N-97, TR-281
Contract N00014-75-C-0451
Prepared in cooperation with University of Southern California, Los Angeles.

Consider the linear regression model Y = x theta + epsilon where Y denotes a vector of n observations on the dependent variable, x is a known matrix, theta is a vector of parameters to be estimated and epsilon is a random vector of uncorrelated errors. If X'X is nearly singular, that is if the smallest characteristic root of X'X is small then a small perturbation in the elements of X, such as due to measurement errors, induces considerable variation in the least squares estimate of theta. In this paper we examine for the asymptotic case when n is large the effect of perturbation with regard to the bias and mean squared error fo the estimate. (Author)

AD-A087 288/7 PC **A03**/MF **A01**
Illinois Univ At Chicago Circle Dept of Mathematics
Stochastic Ordering and a Class of Multivariate New Better Than Used Distributions.
Interim rept.,
Emad El-Neweihi. Jun 80, 29p AFOSR-TR-80-0560
Grant AFOSR-76-3050

A new characterization for the univariate class of new better than used (NBU) distributions in terms of stochastic ordering is introduced. A multivariage version of this characterization is then used to define a multivariate class of NBU distributions. Basic properties of this class are derived. Comparison and relationships of this new class with earlier classes are developed. Two multivariate new worse than used (NMW) classes of life distributions are defined and compared and their basic properties are studied. (Author)

AD-A087 359/6 PC **A02**/MF **A01**
Claremont Men'S Coll CA Inst of Decision Science
A Comparison between MLE and BLUE for a Decreasing Failure Rate Distribution when Using Censored-Data.
Technical rept.,
James Lucke, Janet Myhre, Sam Saunders, and Patrick Williams. Mar 80, 25p Rept no. 80-3
Contract N00014-78-C-0213

Estimation procedures for the shape and scale parameters of a mixed exponential, decreasing failure rate distribution are compared and the more advantageous methods are determined for various situations. The maximum likelihood estimate, MLE, is slightly more accurate than Best Linear Unbiased Estimator of the scale parameter based on the first K order statistics. In the joint case the MLE's are much superior to other possible estimates of the distribution. (Author)

AD-A087 368/7 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Simulation of Some Autoregressive Markovian Sequences of Positive Random Variables.
Technical rept.,
Peter A. W. Lewis, and A. J. Lawrance. Oct 79, 29p Rept no. NPS55-79-024
Presented at the Winter Simulation Conference Dec 79.

Methods for simulating dependent sequences of continuous positive-valued random variables with exponential, Gamma, mixed exponential and uniform marginal distributions are given. In most cases the sequences are first-order, linear autoregressive, Markovian processes. A two-parameter family of this type with exponential marginals is defined and its transformation to a similar multiplicative process with uniform marginals is given. It is shown that for a subclass of this two-parameter family extension to mixed exponential marginals is possible, giving a model of broad applicability for analyzing data and modelling stochastic systems. Efficient simulation of some of these schemes is discussed. (Author)

AD-A087 369/5 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Regression-Adjusted Estimates for Regenerative Simulations, with Graphics.
Technical rept.,
Peter A. W. Lewis, and P. Heidelberger. Apr 80, 55p Rept no. NPS55-80-019

The independent block structure of regenerative processes and the known convergence rates of

the means of ratio estimators are exploited to produce bias-free regression-adjusted estimates (rare's) for regenerative simulations. Direct assessments of the variances of the estimates are obtained, as well as indications--both formal and graphical--of their normality or non-normality. (Author)

AD-A087 373/7 PC **A03**/MF **A01**
Ohio State Univ Columbus Dept of Statistics
Heteroscedasticity.
Technical rept.,
Edward J. Dudewicz. Jul 80, 28p Rept no. TR-209
Contract N00014-78-C-0543

Recently developed methods of dealing with heteroscedasticity without transformations, in ANOVA, confidence intervals, and ranking and selection, are given. Practical aspects, a numerical example, contrasts with other approaches, and critical analysis are given. (Author)

AD-A087 386/9 PC **A02**/MF **A01**
Purdue Univ Lafayette IN School of Industrial Engineering
Multivariate Modeling in Simulation: A Survey,
Bruce Schmeiser, and Ram Lal. 1980, 6p
Contract N00014-79-C-0832
Pub. in ASQC Technical Conference Transactions, p253-260 1980.

No abstract available.

AD-A087 392/7 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Mathematics
Another Generalization of Caratheodory's Theorem.
Technical rept.,
Victor Klee. May 80, 7p Rept no. TR-67
Contract N00014-67-A-0103-0003

When P is a d-dimensional convex polytope with vertex-set V, the term V-simplex to denote a d-simplex whose vertices all belong to V is used. When k = 0 the theorem is Caratheodory's and when k = d-1 it is a slight sharpening of Goodearl's conjecture.

AD-A087 396/8 PC **A02**/MF **A01**
Arizona Univ Tucson Dept of Mathematics
On the Numerical Integration of Two-Point Boundary Value Problems for Stiff Systems of Ordinary Differential Equations.
Technical rept.,
Joseph E. Flaherty, and Robert E. O'Malley, Jr. Jun 80, 11p Rept no. 30
Contract N00014-76-C-0326, Grant AFOSR-80-0192
Presented at the International Conference on Boundary and Interior Layers, 3-6 Jun 80, Dublin. Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY.

A class of two-point boundary value problems are considered for systems for the form dx = f(x, y, t, epsilon), edy = g sub 1 (x, t, epsilon) + g sub 2 (x, t, epsilon)y where the matrix g sub 2 (x, t, o) has a hyperbolic splitting with a fixed number of stable and unstable eigenvalues. Solutions to such boundary value problems can then be expected to have boundary layer behavior near both endpoints in the limit epsilon approaches 0 to a + value. Our analysis shows, in particular, how to determine the reduced order boundary value problem satisfied by the limiting interior solution. Orthogonal matrix methods are used to determine this reduced problem and appropriate boundary layer corrections in a computationally effective manner. Numerical experiments with model problems illustrate the possibility of multiple solutions and show how our asymptotic results can be used in combination with the COLSYS code for solving two-point problems via collocation.

AD-A087 397/6 PC **A03**/MF **A01**
CRINCON Corp La Jolla CA
Internal Wave Measurements for Statistical Hypothesis Testing.
Final rept.,
Richard A. Altes. 5 May 80, 49p Rept no. OC-R-80-0948-2
Contract N00014-79-C-0948

If internal wave measurements are to be used for a hypothesis test, then the best description of the measurements is a multivariate probability density function. This report discusses the estimation of such a probability distribution, along with the associated concepts of Gaussianity, stationarity, homogeneity, isotropy, and frequency-wave number spectra for random fields. By drawing upon these concepts, the report offers suggestions for thermistor or current meter placement, for Doppler sonar design, and for tests of Gaussianity and stationarity. (Author)

AD-A087 428/9 PC **A03**/MF **A01**
Stanford Univ CA Systems Optimization Lab
Computing Finite-Difference Approximations to Derivatives for Numerical Optimization.
Technical rept.,
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright. May 80, 27p Rept no. SOL-80-6
Contracts N00014-75-C-0267, DAAG29-79-C-0110
Sponsored in part by grants DE-AC03-76SF00326, DE-AT03-76ER72018, NSF-MCS79-26009 and NSF-ENG77-06761.

Finite-difference approximations to derivatives are useful not only in optimization algorithms, but also in other circumstances such as sensitivity analysis. In this paper we discuss methods for estimating the relative cancellation error and relative truncation error in a finite-difference approximation and propose a technique for computing the finite-difference interval so that the bounds upon the errors are balanced. We also propose a method for choosing the finite-difference interval in a quasi-Newton algorithm for unconstrained minimization that uses function values only. (Author)

AD-A950 001/8 PC **A03**/MF **A01**
Naval Ship Research and Development Center Bethesda MD Applied Mathematics Lab
Reducing the Bandwidth of Sparse Symmetric Matrices.
Technical note,
E. Cuthill, and J. McKee. Jun 69, 30p Rept no. AML-40-69

No abstract available.

AD-029 280/5 MF **A01**
Johns Hopkins Univ Baltimore MD
Notes on an Approximation Method for Fitting Parabolic Equations to Experimental Data
A. CHAPANIS. 30 Sep 53, 10p
Contract n5ori16601
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

12B. Operations Research

AD-A087 029/5 PC **A04**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Averaging Methods for the Asymptotic Analysis of Learning and Adaptive Systems, with Small Adjustment Rate. Analysis of Nonlinear Stochastic Systems with Wide-Band Inputs.
Technical rept.,
H. J. Kushner, Y. Bar-Ness, and Hai Huang. Apr 80, 57p Rept no. LCDS-TR-80-1
Contract N00014-76-C-0279, Grant AFOSR-76-3063
Sponsored in part by Grants, NSF-ENG77-12946.

Recently proved theorems concerning weak convergence of non-Markovian processes to diffusions, together with an averaging and a stability method, are applied to two (learning or adaptive) processes of current interest: (1) an automata model for route selection in telephone traffic routing, (2) an adaptive quantizer for use in the transmission of random signals in communication theory. The models are chosen because they are prototypes of a large class to which the methods can be applied. The technique of application of the basic theorems to such processes is developed. Suitably interpolated and normalized 'learning or adaptive' processes converge weakly to a diffusion, as the 'learning or adaptation' rate goes to zero. For small learning rate, the qualitative properties (e.g., asymptotic (large-time) variances and parametric dependence) of the processes can be determine from the properties of the limit. (Author)

AD-A087 058/4 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Computer Science
On a Soviet Algorithm for the Linear Programming Problem,
J. F. Traub, and H. Wozniakowski. Dec 79, 5p
Contract N00014-76-C-0370, Grant NSF-MCS76-23676
Prepared in cooperation with Columbia Univ., New York. Dept. of Computer Science.

Science reported ('Mathematicians Amazed by Russian's Discovery', Science 206,545 (1979)) a new algorithm 'of great theoretical and probably practical importance' for the solution of linear programming problems. The algorithm was ascribed to a Soviet mathematician L. G. Khachian. We have received numerous inquiries from people in business, government and universities concerning this algorithm. Here we shall confine ourselves to answering only two questions: What is the practical value of this algorithm and what is its history. We answer each of these in turn. Our analysis and preliminary experimentation indicate that the method is not of practical interest. It is possible that the ideas of the Soviet method, in combination with new ideas, will eventually lead to a method competitive with Simplex. But that is not the case today. We believe referring to this as Khachian's method is incorrect. Since five Soviet mathematicians have contributed, we propose naming this the 'Soviet Algorithm'.

AD-A087 080/8 PC **A03**/MF **A01**
Texas Univ At Austin Center for Cybernetic Studies
A 'Multiple Pivoting' Algorithm for Goal-Interval Programming Formulations.
Research rept.,
R. D. Armstrong, A. Charnes, W. D. Cook, and J. P. Godfrey. Mar 80, 27p Rept no. CCS-RR-355
Contract N00014-80-C-0242

Goal programming has become a popular and important planning tool in many areas. However, the main direction of goal programming research has been in formulating models instead of seeking procedures that would provide improved computational efficiency. (Author)

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A087 266/3 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Selection of Cooling Water Treatment at Military Installations to Prevent Scaling and Corrosion.
Final rept.,
R. Lane, and A. Kumar. Jun 80, 31p Rept no. CERL-TR-M-280

This report offers solutions for scaling, corrosion, and fouling problems in cooling tower systems at

Army and Air Force installations. These problems are caused by dissolved minerals in the water and growth of algae or slime within the system. The scaling product (SP) of cooling tower water can be expressed as a product of the calcium hardness (Ca) and alkalinity (M) expressed as CaCO3. The SP of water at major U.S. Army Training and Doctrine Command and U.S. Army Forces Command installations varies from 504 to 45,640. The State of Illinois has tested recently developed treatment products made by commercial enterprises. The simplest method of cooling tower treatment is blowdown control. A reciprocating cooling tower evaporates 1.5 gallons of water per hour per ton (5.67 l/0.9 MT), while an absorber evaporates 3 gal/hr/ton (11.12 l/0.9 MT). The blowdown rate equals the evaporation rate divided by, cycles of concentration minus 1. The makeup water equals the amount of evaporation plus blowdown. The maximum cycles of concentration are limited by the scaling chemicals in the water; it is considered uneconomical to run less than 3 cycles of concentration. For cooling towers less than 20 tons (18.1 MT), the water should be air cooled or passed once only. For cooling towers of 20 to 50 tons (18.1 to 45.3 MT), 3 cycles of concentration with sodium hexametaphosphate (0.5 to 5 ppm) should be used

AD-A087 295/2 PC **A02**/MF **A01**
Johns-Manville Sales Corp Denver CO Research and Development Center
Heat Reclamation from Flight Simulators.
Final rept. 1 Sep 78-1 Mar 80,
P. B. Shepherd. 13 Jun 80, 17p USAFESA-TS-2083

A survey of selected Army flight simulator facilities was performed to determine the applicability of heat recovery devices to the associated air conditioning equipment. It was concluded that there is little potential for heat recovery at nearly all of the facilities because the refrigerant used (R-22) and the operating characteristics of the chillers produce compressor discharge temperatures too low to be suitable for any purposes other than chilled air reheat for humidity control. (Author)

AD-A087 300/0 PC **A03**/MF **A01**
Welco Industries Inc Cincinnati OH
Operation and Maintenance Manual, TECS 18.
Nov 78, 39p
Contract DAAG53-75-C-0274

The Welco Industries Total Environmental Control system (TECS 18) operates from multiple frequency power sources to provide solid-state proportional temperature control of both air conditioning and heating. Three independently controlled pulse-width modulated variable frequency inverters provide variable speed control of a compressor, condenser fan and evaporator fan motors. Zero-crossing heat controls provide 5.6Kw proportional heat and 3.8 Kw ON-OFF heat in the two HEAT modes. The electronic controls are located within the four basic modules. The Evaporator Drawer contains the system control logic in addition to the inverter drive circuitry for the evaporator fan. The Power Deck contains the main system power supplies and the Comp/Cond Drawer contains the inverter drive circuitry for both the compressor motor and the condenser fan.

PATENT-4 206 746 Not available NTIS
Department of the Navy Washington DC
Spiral-Passage Heat Exchanger.
Patent,
Talbot A. Chubb. Filed 10 Mar 78, patented 10 Jun 80, 8p AD-D007 397/3, PAT-APPL-876 447
Supersedes PAT-APPL-876 447-78, AD-D004 733.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A spiral passage chemical converter-heat exchanger formed by a cross-sectional rectangular housing containing a pair of rows each containing a plurality of side-by-side passages. The rectangular housing is wound into a spiral with the innermost row forming inlet passages and the outermost row forming outlet passages. Thermal contact exists between inflow passages and outflow passages. The outer end of the spiral is connected with an inlet and an outlet. The inlet joins the innermost row of passages and the outlet joins the outermost row of passages. The inner end of the spiral is capped, with a common wall separating the upper and lower passages slotted so that fluid flows from the inlet passages to the outlet passages. As can be seen when the structure is in a spiral, the inlet passages are between the outlet passages with the outlet passages forming the outer exposed surface of the spiral and the inlet passages forming the surface of the opening through the spiral at the center. A concave sunlight reflector will focus sunlight into the central opening of the spiral thereby heating the fluid in the inlet passages. Since the outlet passages are separated by the inlet passages in the spiral and are in thermal contact therewith, the solar heated outlet fluid will heat the input fluid as it circles the spiral to the outlet passages.

PB80-205321 PC **A05**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Research, Development, and Demonstration of a High-Efficiency Gas-Fired Water Heater. Annual Report for 1979,
T. S. Zawacki, J. W. Zimmer, and R. A. Macriss.
Jan 80, 77p GRI-79/0027
Contract GRI-5011-345-0093

A near term, high efficiency, prototype gas-fired, storage water heater was designed and constructed, utilizing a new flue passage design and a companion flue baffle (or turbulator) to increase the rate of heat transfer. Using DOE's test procedure methodology for gas-fired water heaters, the maximum seasonal average daily gas consumption of the advanced prototype was determined.

PB80-205388 PC **A07**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Development and Demonstration of a Stirling/Rankine Heat Activated Heat Pump.
Semi-annual rept. Jan-Jun 79,
R. C. Meier. Oct 79, 134p GE-DOCUMENT-80SDS4215, GRI-79/0008, COO-2911-5
Contracts DOE-EC-77-C-02-2911, GRI-5010-341-0052
Prepared in cooperation with American Gas Association, Inc., Arlington, VA.

Testing of a residential size, free-piston Stirling engine combined with a free-piston linear compressor, gas fired heat pump has been completed. During the course of this work, performance and operating characteristics of the system and its components were established. Testing of the first prototype was instrumental in determining those design modifications needed to achieve performance goals. A field test prototype was fabricated, and a gas utility sponsored test home was selected.

PB80-205396 PC **A04**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Development and Field Verification of a Model of Excess Infiltration and House Air Infiltration for Single-Family Residences. Final Report for 1979,
James T. Cole, Jon W. Zimmer, Thomas S. Zawacki, John A. Kinast, and Robert H. Elkins.
Jan 80, 53p GRI-79/0031
Contract GRI-5014-341-0111

This report discusses a generalized model of air infiltration, partial refinement of the model by the development (and inclusion into the model) of 3 support models (for total crackage, wind shielding and structural permeability), and partial verification of the model by comparison to detailed, measured house infiltration data obtained by other investigators in 2 test homes. The report also presents a review of literature air infiltration models and of their limitations.

PB80-205404 PC **A05**/MF **A01**
Allied Chemical Corp., Morristown, NJ.
Development of a Residential Sized Gas Fired Absorption Heat Pump.
Annual rept. Jan-Oct 79,
R. A. Allen, and K. P. Murphy. Apr 80, 93p GRI-79/0038
Contract GRI-5014-341-0113

The development program for a residential gas fired absorption heat pump is described. The unit, based on a new absorption pair, is designed to supply 36,000 BTU/HR cooling and 90,000 BTU/HR heating. Component and system development are described as are the physical-thermodynamic properties of the fluids.

PB80-205438 PC **A03**/MF **A01**
Thermal Systems Engineering, Inc., Woburn, MA.
Heat Recovery Devices - New.
Final rept. 1 Mar-31 Oct 79,
Andrew J. Syska, and A. Brzezinski. Apr 80, 50p GRI-78/0041
Contract GRI-5011-341-0121

A concept was developed for a compact and lightweight jet impingement recuperator suitable for recovering heat from residential and commercial gas fired heating systems. Heat transfer and pressure drop analyses were completed confirming feasibility of the concept. Preliminary, cost effective design for the recuperator was also completed and optimized for compactness and for low pressure drop compatible with natural chimney drafts.

PB80-205453 PC **A03**/MF **A01**
Midland-Ross Corp., Toledo, OH. Thermal Systems - Technical Center.
Industrial Burner and Process Efficiency Program.
Annual rept. for 1979,
S. R. Huebner, and S. N. Singh. Mar 80, 37p GRI-78/0040
Contract GRI-5011-342-0148

An analysis of the FM control burner in a cold model test has shown that FM control has the capability of increasing the turbulent convective velocity of the jet stream compared to conventional AM control. Thus, it results in a higher convective heat transfer coefficient and higher thermal efficiencies. Based on the concepts formulated, a high momentum burner has been designed. This burner has been successfully fired with natural gas and No. 2 fuel oil, using combustion air preheated to 1100F.

PB80-205461 PC **A03**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Open Cycle Vapor Compression Heat Pump. Annual Report for 1979,
Ravi Sakhuja, and Frederick E. Becker. Jul 80, 45p TE4224-252-80, GRI-79/0042
Contract GRI-5011-342-0094

A compressor test facility was built incorporating a screw compressor modified for steam service. The compressor was tested over a wide range of operating conditions with experimental results showing excellent agreement with predicted performance. The compressor operation with wet steam and water injection was completely satisfactory, demonstrating its suitability for use in a steam heat pump system.

PB80-205479 PC **A04**/MF **A01**
American Gas Association Labs., Cleveland, OH.
Environmental Control of Gas Appliances. Annual Report for 1979,
A. M. Waters, and R. L. Himmel. Jan 80, 66p
Contract GRI-5014-352-0163

The report discusses studies aimed at reducing the NOx emissions from gas-fired furnaces and water heaters by minor modifications of the combustion system, such as derate, primary air adjustment and excess air minimization. The influence of NOx emission reduction and seasonal efficiency improvement on the NOx emission factor in nanograms/joule heat output are discussed. Emission inventory for gas-fired clothes dryers and a pulse combustion type boiler are presented. Further studies of the effect of burner design on NOx emission is discussed as in the effect of changes in the fuel gas composition. Finally, a report on proper sampling of a gas-fired appliance is reviewed and the highlights presented in this report.

PB80-207046 PC **A09**/MF **A01**
KVB, Inc., Irvine, CA.
Thirty-day Field Tests of Industrial Boilers: Site 2 - Residual-oil-fired Boiler.
Final rept. Mar 79-Mar 80,
W. A. Carter, and R. J. Tidona. Apr 80, 195p EPA-600/7-80-085B

Contract EPA-68-02-2645

This report is a final one for a test program to evaluate the long-term effectiveness of combustion modifications on industrial boilers. Previous short-term tests had been performed on industrial boilers to determine the effect of combustion modifications on such air pollutant emissions as NOx, SOx, CO, HC, and particulate. The objective of this program was to determine if the combustion modification techniques which were effective for the short-term tests are feasible for longer periods. The report gives results of a 30-day field test of a 26.4 MW output (90,000 lb steam/hr) residual-oil-fired boiler using staged combustion air and low excess air to control NOx emissions. Results indicate that these combustion modifications are effective long-term NOx controls for this type of residual-oil-fired boiler. The as-found NOx concentration was 158 ng/J (281 ppm at 3% O2, dry). With staged combustion and low excess air firing, the mean NOx emission level was 110 ng/J (196 ppm at 3% O2, dry). Boiler efficiency increased by 0.7% under low NOx firing conditions.

PB80-209885 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Economic Analysis of Improved Efficiency for Central Air Conditioners.
Final rept.,
Stephen R. Petersen, George E. Kelly, and David A. Didion. Jun 80, 56p NBSIR-80-1993
Sponsored in part by Department of Energy, Washington, DC. Office of Building and Community Systems.

The development of minimum performance standards for central air is required by the National Energy Act of 1978 and is the responsibility of the Department of Energy (DOE). This report attempts to assist DOE in this endeavor by providing an analysis of the life-cycle savings and costs associated with improvements in the energy efficiency of central air conditioners. It develops a rational methodology that can be used in setting minimum standards which are economically and technically justified and makes recommendations which the authors feel meet these criteria for both split and package central air conditioners.

13B. Civil Engineering

AD-A086 894/3 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Upper Stokes Dam (NJ00421), Delaware River Basin, Sharps Branch of Haynes Creek, Burlington County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Rudolph Wrubel. Feb 80, 52p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A086 895/0 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lower Aetna Lake Dam (NJ00418), Delaware River Basin, Tributary to Haynes Creek, Burlington County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Rudolph Wrubel. Mar 80, 85p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Lower Aetna Lake Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillways are considered inadequate because a flow equivalent to five percent of the One Hundred Year Flood would cause the dam to be overtopped. To ensure adequacy of the structure, the following actions, as a minimum are recommended: (a) The spillways' adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings, remedial measures to ensure spillway adequacy should be initiated, and (b) Within six months from the date of approval of this report, the following remedial actions should be initiated: (1) Embankment areas behind the culvert wingwalls that have been eroded should be regraded and covered with slope protection, (2) Remove trees on the downstream embankment to lessen the piping potential, and (3) Divert water at the crest of the downstream slope to avoid gullying. Consideration should be given to constructing an extended asphalt lip curb along the rear edge of the pavement to control the run-off.

AD-A086 896/8 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Clinton Reservoir Dam (NJ 00314) Passaic River Basin, Clinton Brook, Passaic County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. Apr 80, 85p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Fredic R.), Inc., Woodbridge, NJ. Includes Enevelope with charts and maps. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A086 897/6 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Cranes Lake Dam (NJ 00444). Atlantic Coast Basin, Branch of Great Egg Harbor River, Gloucester County, New Jersey. Phase I Inspection Report.
Final rept.,
Rudolph Wrubel. Mar 80, 57p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Cranes Lake Dam, initially listed as a 'high' hazard potential structure, but reduced to a 'significant' hazard potential structure as a result of this inspection is judged to be in good overall condition. The dam's spillway is considered inadequate because a flow equivalent to 86 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood).

AD-A086 898/4 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Jaqui Dam (NJ 00357) Passaic River Basin, North Branch, Whippany River, Morris County. New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Apr 80, 87p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering. Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Jaqui Dam, a high hazard potential structure, is judged to be in good overall condition. The dam's spillway is considered inadequate because a flow equivalent to 31 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instances, is one half of the Probable Maximum Flood.) The decision to consider the spillway 'inadequate' instead of 'seriously inadequate' is based on the determination that dam failure from overtopping would not significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

AD-A086 899/2 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Sonoma Dam (NJ 0193), Passaic River Basin, Branch of Burnt Meadow Brook, Passaic County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. Mar 80, 78p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederick R.), Inc., New York. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Lake Sonoma Dam, initially listed as a high hazard potential structure but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in good overall condition. The dam's spillway is considered inadequate because a flow equivalent to 95 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is the 100 year flood.)

AD-A086 900/8 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Upper Aetna Lake Dam (NJ 00420), Delaware River Basin, Sharps Branch of Haynes Creek, Burlington County, New Jersey. Phase I Inspection Report.
Final rept.,
Rudolph Wrubel. Feb 80, 67p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Upper Aetna Lake Dam is a 32-year old earth roadway embankment approximately 230 feet long with a timber box spillway and bridge located about 60' from the west abutment. The embankment carries an asphalt paved two-lane road across the dam structure. The three-sided timber box spillway is affixed to the upstream face of the pile-supported one-span timber bridge and has a total crest length of 35.67 feet with one set of removable flashboards 3 feet 4 inches wide. Upper Aetna Lake Dam is assessed to be in a fair overall condition and is recommended to be downgraded to a significant hazard category. Overtopping would not exacerbate the danger to downstream property or human life and no detrimental findings were uncovered to question the structural stability. Remedial actions to be undertaken in the future consist only of regrading and seeding the minor erosion on the embankment sideslopes. The dam has an inadequate spillway capacity, being able to accommodate only 5% of the 100 year design flood. Further hydraulic studies are recommended.

AD-A086 901/6 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton

National Dam Safety Program. Peddie Lake Dam (NJ 00149), Rahway River Basin, Rocky Brook, Mercer County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Mar 80, 83p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproduction will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 191/3 MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Documentation for LMVDPILE Program.
Final rept.,
Deborah K. Martin, H. Wayne Jones, and N. Radhakrishnan. Jun 80, 192p Rept no. WES-TR-K-80-3
Availability: Microfiche copies only.

The primary work reported here consists of consolidating the rigid cap pile analysis programs of the U. S. Army Engineer Districts, St. Louis and New Orleans. The new program, LMVDPILE, is documented with example problems in this report. The work was performed at the request of the Lower Mississippi Valley Division and provides the capability of analyzing two-dimensional or three-dimensional pile foundations according to Division guidelines. The report includes discussions of factors influencing pile group behavior and of the analytical procedure, a user's guide, and several example problems for the pile analysis program LMVDPILE. Also included are two appendices. Appendix A describes the computer program PILESTF which computes the pile head stiffness coefficients for piles in soils with varying moduli. Appendix B describes the computer program FDRAW which is an interactive graphics post-processor. Each appendix includes a general introduction, a user's guide, and example problems. (Author)

AD-A087 216/8 PC **A04**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Charcoal Regeneration - Part II. Modified Carbon Surface Activity and Reversibility of TNT Adsorption.
Technical rept.,
J. Haberman, T. Castorina, S. Semel, and H. Kramer. Jul 80, 65p ARLCD-TR-80012, AD-E400 442
See also Part I, AD-A048 757.

The TNT adsortion/solvent desorption cycling of activated carbon (FS300) has been studied as a function of various pretreatments. The preferential plugging of pores by the pretreatments did not enhance the regenerative property of the FS300. In conjunction with water adsorption/desorption isotherms, the characteristics of a carbon with an improved cycling property has been elucidated. The improved property is due to a shift to larger pore volume and a larger ratio of pore opening to pore body diameters. Chemical regeneration of an activated carbon containing irreversible adsorbed TNT has been shown to be unfeasible.

AD-A087 260/6 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Data Collection Methods for Sand Inventory-Type Surveys.
Coastal engineering technical aid rept.,
Dennis A. Prins. Mar 80, 20p Rept no. CERC-CETA-80-4

During recent years the shallow areas of the Continental Shelf have been found to be a potential source for suitable sand for beach-fill projects. This report describes the techniques and methods used in the planning and implementation of the data collection effort associated with surveys conducted to locate and delineate offshore sand sources for beach-fill projects. (Author)

AD-A087 276/2 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Indian Mills Dam (NJ00042) Atlantic Coast Basin, Muskingum Brook, Burlington County, New Jersey, Phase 1 Inspection Report.
Final rept.,
Rudolph Wrubel. Feb 80, 63p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 277/0 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lindys Lake Dam (NJ00201), Passaic River Basin, Branch of West Brook, Passaic County, New Jersey. Phase 1 Inspection Report.
Final rept.,
John Talerico. Feb 80, 91p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 279/6 PC **A09**/MF **A01**
Herner and Co Washington DC
Publication Index and Retrieval System.
Final rept.
Apr 80, 195p WES-DS-78-23
Contract DACW39-77-C-0081
Report on Dredged Material Research Program.

The 'Publication Index and Retrieval System' is designed to facilitate dissemination of the information contained in the more than 200 reports resulting from the Dredged Material Research Program (DMRP) and to foster operational applications of their findings and conclusions. Information referenced in this document is applicable to project environmental assessments, detailed design, construction, and operation and maintenance as well as evaluation under requirements of regulatory functions programs. Chapter 1 contains abstracts of the DMRP Synthesis Reports, which present summaries of findings for each of the major DMRP objectives with emphasis on the significance and application of the information. Chapters 2-9 contain abstracts for each of the detailed reports; the abstracts are identified under the major DMRP objectives. Chapter 10 contains the abstracts of the reports on the field tests and demonstration projects concerned with the effects of dredged material disposal in open water and the use of dredged material for habitat creation. The abstracts are also indexed as follows: subject, geographic location, agency/organization, and author. (Author)

AD-A087 297/8 MF **A01**
California Univ Berkeley Earthquake Engineering Research Center
Earthquake Response of Concrete Gravity Dams Including Hydrodynamic and Foundation Interaction Effects,
Anil K. chopra, P. Chakrabarti, and Sunil Gupta. Jan 80, 202p Rept no. UCB/EERC-80/01
Contract DACW73-71-C-0051, Grant NSF-ATA74-20554
Sponsored in part by Grant NSF-ENV76-80073.
Availability: Microfiche copies only.

A general procedure for analysis of the response of concrete gravity dams, including the dynamic effects of impounded water and flexible foundation rock, to the transverse (horizontal) and vertical components of earthquake ground motion is presented. The problem is reduced to one in two dimensions, considering the transverse vibration of a monolith of the dam. The system is analyzed under the assumption of linear behavior for the concrete, foundation rock and water. The complete system is considered as composed of three substructures -- the dam, represented as a finite element system, the fluid domain, as a continuum of infinite length in the upstream direction, and the foundation rock region as a viscoelastic halfplane. The structural displacements of the dam are expressed as a linear combination of Ritz vectors, chosen as normal modes of an associated undamped dam-foundation system. The effectiveness of this analytical formulation lies in its being able to produce excellent results by considering only a few Ritz vectors. The modal displacements due to earthquake motion are computed by synthesizing their complex frequency responses using Fast Fourier Transform procedures. The stress responses are calculated from the modal displacements. An example analysis is presented to illustrate results obtained from this analytical procedure. Computation times for several analyses are presented to illustrate effectiveness of the procedure.

AD-A087 312/5 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Seeley's Pond Dam (NJ00368) Raritan River Basin, Blue Brook, Union County, New Jersey. Phase I Inspection Program.
Final rept.,
Richard J. McDermott. Feb 80, 78p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions are in black and white.

Based on visual inspection, available records, calculations and past operational performance, Seeley's Pond Dam, initially listed as a 'high' hazard potential structure, but reduced to a 'significant' hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 40 percent of the 100-year flood would cause the dam to be overtopped.

AD-A087 313/3 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Roosevelt Park Dam (NJ00378) Rahway River Basin, South Branch Rahway River, Middlesex County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott. Jan 80, 87p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Storch Engineering, Florham Park, NJ.

Based on visual inspection, available records, calculations and past operational performance, Roosevelt Park Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to nine percent of the 100-year flood would cause the dam to be overtopped.

AD-A087 314/1 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. DeCozen's Dam (NJ00353) Passaic River Basin, Troy Brook, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,

Richard J. McDermott. Apr 80, 91p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in balck and white. Prepared in cooperation with Storch Engineering, Firham Park, NJ.

Based on visual inspection, available records, calculations and past operational performance, De Cozen's Dam, initially listed as a 'high' hazard potential structure, but reduced to a 'significant' hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to nine percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood).

AD-A087 322/4 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Johnson Lake Dam (NJ00499), Passaic River Basin, Tributary to Lubbers Run Brook, Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Jan 80, 96p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Anderson-Nichols and Co., Inc., Concord, NH.
Availability: Microfiche copies only.

Based on visual inspection, available records, calculations and past operational performance, Johnson Lake Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to seven percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood).

AD-A087 323/2 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Washington Forge Pond Dam (NJ00341), Passaic River Basin, Rockaway River, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Mar 80, 105p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Anderson-Nichols and Co., Inc., Concord, NH.
Availability: Microfiche copies only.

Based on visual inspection, available records, calculations and past operational performance, Washington Forge Pond Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to ten percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood).

AD-A087 324/0 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Amwell Number 2 Dam (NJ00522), Delaware River Basin, Tributary of Alexauken Creek, Hunterdon County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Richard J. McDermott. Mar 80, 84p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Storch Engineering, Florham Park, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 325/7 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Oldham Pond Dam (NJ00238), Passaic River Basin, Molly Ann Brook, Passaic County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Jan 80, 153p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Anderson-Nicholes and Co., Inc., Concord, NH. Includes envelope with map.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 326/5 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Indian Lake Dam (NJ00188), Delaware River Basin, Indian Run, Monmouth County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Richard J. McDermott. Mar 80, 90p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 327/3 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Stony Brook Watershed Dam Site Number 7 (NJ00344), Raritan River Basin, Stony Brook, Mercer County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Richard J. McDermott. Feb 80, 96p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 328/1 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Green Turtle Pond Dam (NJ00190), Passaic River Basin, Branch of Wanaque River, Passaic County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. Feb 80, 81p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ. Includes envelope with maps.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 329/9 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Electric Light Pond Dam (NJ00245), Hackensack River Basin, Pascack Brook, Bergen County, New Jersey. Phase I Inspection Report.
Final rept.,
John Talerico. Feb 80, 118p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R), Inc., Woodbridge, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 330/7 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Erskine Upper Lake Dam (NJ00197), Passaic River Basin, Tributary to Wanaque River, Passaic County, New Jersey. Phase 1 Inspection Report.
Final rept.,
John P. Talerico. Feb 80, 84p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 331/5 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Millsboro Pond Dam, (DE00018), Delaware River Basin, Indian River, Sussex County, Delaware. Phase I Inspection Report.
Final rept.,
John J. Williams. Dec 79, 90p
Contract DACW61-78-C-0052
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 332/3 MF **A01**
New Jersey Dept of Environmental Protection Trenton

National Dam Safety Program. West Milford Lake Dam (NJ00189). Passaic River Basin, Longhouse Creek, Passaic County, New Jersey. Phase 1 Inspection Report.
Final rept.,
John P. Talerico. Feb 80, 92p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.), Inc., Woodbridge, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 333/1 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Kitchell Lake Dam (NJ00026), Passaic River Basin, Branch of West Brook, Passaic County, New Jersey. Phase I Inspection Report.
Final rept.,
John P. Talerico. Feb 80, 77p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris (Frederic R.) Inc., Woodbridge, NJ.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A087 346/3 PC **A03**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Coastal Engineering Research Center: Its Mission and Capabilities,
Andre Szuwalski, and Linda Clark. May 80, 29p

The Coastal Engineering Research Center (CERC) is one of five laboratories and research centers of the U.S. Army Corps of Engineers. This publication describes CERC's mission, capabilities, and facilities. (Author)

AD-A950 002/6 PC **A14**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Investigations of Pressures and Deflections for Flexible Pavements. Report Number 1. Homogeneous Clayey-Silt Test Section.
Technical memo.
Mar 51, 315p Rept no. WES-TM-3-323-1
See also Rept. no. AEWES-TM-3-323-5 dated Dec 60, AD-265 628.

No abstract available.

NUREG-0692 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Steam Generator Repair at Surry Power Station, Unit No. 1, Virginia Electric and Power Company, Docket No. 50-280.
Final environmental statement.
Jul 80, 70p

A Final Environmental Statement for the Surry Power Station Unit No. 1 Steam Generator Repair Program has been prepared by the Office of Nuclear Reactor Regulation. This Statement considers the environmental impacts and economic costs of the proposed steam generator repair at Surry Power Station Unit 1. The Statement focuses on the occupational radiation exposure associated with the proposed Unit 1 repair program and on alternatives to reduce this exposure. It concludes that the proposed repair will not significantly affect the quality of the human environment. Furthermore, any impacts from the repair program are outweighed by its benefits. Also included are comments of Federal, State and local government agencies and certain non-governmental organizations and individuals.

PB80-202955 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Marine Ecosystems Analysis Program Office.
Environmental Investigations during Manganese Nodule Mining Tests in the North Equatorial Pacific in November 1978.
Technical memo.,
E. Ozturgut, J. W. Lavelle, O. Steffin, and S. A. Swift. May 80, 58p NOAA-TM-ERL-MESA-48, NOAA-80061002

The results of environmental studies conducted during the monitoring of a pilot-scale manganese nodule mining operation by Deepsea Ventures, Inc./Ocean Mining Associates are presented. These studies included observations of the chemical and physical structure of the upper 300 m of the water column, nephelometry and particulate sampling, light profiles, primary production experiments, and macrozooplankton studies.

PB80-203771 PC **A10**/MF **A01**
Bogert (Clinton) Associates, Fort Lee, NJ.
Upgrading Primary Tanks with Rotating Biological Contactors.
Final rept. Sep 76-Aug 79,
Alonso Gutierrez, Ivan L. Bogert, O. Karl Scheible, and Thomas J. Mulligan. Mar 80, 218p EPA-600/2-80-003
Grant EPA-R-804854
Prepared in cooperation with Hydroscience Associates, Inc., Westwood, NJ.

A one-year experimental program was conducted at Edgewater, New Jersey, to evaluate the concept of upgrading existing primary wastewater treatment plants to secondary treatment by the installation of rotating biological contactors (RBC's) in the primary sedimentation tanks. The basic concept was to horizontally divide a primary sedimentation tank into two zones by installing an intermediate floor at mid-depth. Four RBC's were placed in the upper zone above the intermediate floor. This zone provided separate biological contact and treatment of the incoming wastes, while the lower zone functioned as a secondary sedimentation zone. Such a configuration would minimize the need for additional tankage and clarifiers, and would be especially suited to plants with limited space.

PB80-204555 PC **A03**/MF **A01**
Maryland State Highway Administration, Brooklandville. Bureau of Research.
Performance Study of the Bituminous Concrete Section of the John F. Kennedy Expressway (I-95).
Final rept.,
Larry D. Beck. Feb 78, 29p FHWA-MD-R-77-5

The main objective of the study is to evaluate the structural adequacy of the rehabilitated and resurfaced flexible pavement section of the JFK Expressway (I-95). The evaluation utilizes the 'Asphalt Institute's Deflection Method for Designing Asphalt Concrete Overlays for Asphalt Pavements'. Benkelman Beam static rebound deflection tests were made each spring for five years. Between 1973 and 1976, twelve of twenty-two areas did not show statistically significant changes. Of the ten areas showing change, one area was singled out in early readings for poor performance. Only three other areas showed statistically significant changes and had recommended overlays of 2 inches or more.

PB80-204563 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
The Response of Illinois Municipal Water Systems to a Prolonged Period of Drought.
Final rept.,
J. C. van Es, L. C. Keasler, and R. L. Whittenbarger. Jun 80, 91p UILU-WRC-80-0152, W80-06079, OWRT-A-090-IL(1)
Contract DI-14-31-0001-8015
Prepared in cooperation with Eastern Illinois Univ., Charleston. Dept. of Sociology.

The research evaluates the impact of the 1976-77 extended periods of shortage of rainfall on Illinois municipal systems. Excluded from the analysis were water systems in the suburban areas of large metropolitan cities. The data were obtained through questionnaires sent to the mayors and water systems operators. The questionnaires were followed by phone and personal interviews in some cases. The survey indicates that prior to the drought those municipalities affected by it were more likely to have smaller water systems, show a smaller margin between daily rated capacity and maximum daily usage, and rely more heavily on surface water sources. Municipalities affected by the drought made efforts to increase the supply of available water and decrease demands for available water.

PB80-204936 PC **A12**/MF **A01**
Catalytic, Inc., Charlotte. NC.
Technology Assessment Report for Industrial Boiler Applications: Oil Cleaning.
Final rept. Jun 78-Sep 79,
E. A. Comley, R. T. Keen, and M. F. Tyndall. Nov 79, 274p EPA-600/7-79-178B
Contract EPA-68-02-2604
See also report dated Aug 79, PB80-150881.

This study assesses the applicability of oil cleaning technology to industrial boilers and is one of a series of technology assessment reports to aid in determining the technological basis for a New Source Performance Standard for Industrial Boilers. The status of development and performance of alternative oil cleaning techniques were assessed and the cost, energy, and environmental impacts of the most promising processes were identified.

PB80-205206 PC **A06**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Railroad R and D Challenges of the 80's: Opportunities and Obstacles. Railroad Engineering Conference Proceedings (15th) Held at Transportation Systems Center, Cambridge, MA. on October 21-23, 1979.
Jun 80, 125p DOT-TSC-FRA-80-10, FRA/ORD-80/35

Conference papers were delivered by various industry and Government officials and centered on three topic areas: The Status of the Northeast Corridor Improvement Project and Passenger R&D; An Overview of Freight Technology Advancements, Obstacles, and Future Opportunities; and Major R&D Opportunities of the 80's. A tour of the Sante Fe-San-Vel concrete crosstie plant in Littleton, Massacnusetts, was included as part of the conference program.

PB80-205768 PC **A05**/MF **A01**
Office of Radiation Programs, Las Vegas, NV.
Above Ground Gamma Ray Logging of Edgemont, South Dakota and Vicinity.
Technical note (Final),
Jack E. Thrall, Joseph M. Hans, Jr., and Vonni Kallemeyn. Feb 80, 80p ORP/LV-80-2
Prepared in cooperation with South Dakota Dept. of Water and Natural Resources, Pierre, SD.

This report summarizes the results of the 1971-72 and 1978 surveys to locate suspected tailings use areas. It also presents and discusses other gamma measurements made in and around Edgemont.

PB80-205800 PC **A04**/MF **A01**
New Jersey Inst. of Tech., Newark.
Evaluation of Sorbents for Industrial Sludge Leachate Treatment.
Final rept. Jun 76-Sep 79,
Paul C. Chan, John W. Liskowitz, Angelo Perna, and Richard Trattner. Jun 80, 59p EPA-600/2-80-052
Grant EPA-R-803717-02

A laboratory and outdoor pilot-scale investigation was conducted on the use of selected sorbents for removing leachate contaminants from three industrial sludges. The laboratory results indicated that, rather than a single sorbent, a combination of acidic and basic sorbents is required in a layered system for removal of all the measurable contaminants from the leachates. These combinations are illite, vermiculite, and a natural zeolite for the acidic

leachate; illite, acidic fly ash for the neutral leachate; and illite, kaolinite, and a natural zeolite for the alkaline leachate. The sorbent capacities exhibited by the natural sorbents are comparable to those exhibited by refined sorbents. The outdoor pilot study, which was limited to the treatment of the calcium fluoride sludge leachate, using lysimeters, some 80 times larger than the laboratory lysimeters, revealed that the sorbent effectiveness depends on the velocity of the leachate through the sorbents and the sorbent removal capacity for specific contaminants. Except for magnesium, effective reductions of the measurable leachate constituents were achieved with the use of illite, acidic fly ash, and a zeolite in the weight ratio of 2:2:1. Sorbent costs have been estimated for various combinations required for treating leachate from calcium fluoride sludge over a ten-year period of landfill operation. For the illite/acidic fly ash/zeolite combination and the illite/acidic fly ash/basic fly ash combination, costs are $1.37 and $0.45 per ton of sludge, respectively.

PB80-205826 PC **A06**/MF **A01**
Sverdrup and Parcel and Associates, Inc., St. Louis, MO.
Evaluation of Full-Scale Sugar Beet Transport Water Solids Dewatering System.
Final rept. Sep 76-Oct 78,
M. F. Figueroa, F. A. Brunner, F. S. Williams, and J. C. Buzzell, Jr. May 80, 124p EPA-600/2-80-089
Contract EPA-68-01-3289

The objectives of this study were to evaluate a full-scale vacuum filtration system for dewatering solids removed from the transport water in an operating beet sugar plant in terms of operational reliability and efficiency, economics, and ultimate disposal of the dewatered solids. At the plant study site the solids in the beet transport water are removed in a clarifier and piped to the Mud House. Waste lime mud from the sugar processing is added to the clarifier underflow to serve as a filter aid. The combined sludge is dewatered on two vacuum filters. The filter cake is pumped to a storage lagoon adjacent to the Mud House.

PB80-205883 PC **A04**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC. Quality Assurance Div.
A Summary of the Interlaboratory Source Performance Surveys for EPA Reference Methods 5, 6, and 7 - 1978.
Final rept.,
R. G. Fuerst, and M. R. Midgett. May 80, 58p EPA-600/4-80-029

A national survey of methods in stationary source tests was conducted in 1978 by the Quality Assurance Division of the Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. In this program, quality assurance samples were sent to interested participants for the measurement of a gas volume (Method 5, dry gas meter only) or the analysis of liquid samples simulating collected sulfur dioxide and nitrogen oxides (Method 6 and 7, respectively). Each participant returned the analytical results to the Source Branch, Quality Assurance Division, for evaluation. An individual report was returned to each participant after processing. This report summarizes the survey results for those three source test methods.

PB80-206212 PC **A03**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Skid Resistance of Bituminous Pavements Built with Carbonate Aggregates.
Research rept. (Final),
Richard W. Miller, and William P. Chamberlin. Apr 80, 47p FHWA/NY/RR-80/77
Report on Development of Skid Resistant Bituminous Surfaces.

This report documents the rationale for changes in carbonate-aggregate specifications enacted in 1969, and the effect that these changes have had on upgrading the skid resistance of bituminous pavements in New York. The new specification required a minimum of 10-percent and sand-sized acid-insoluble residue or a minimum of 20-percent chert particles in crushed limestone coarse aggregate. Limestone aggregates not meeting one of these criteria were required to be blended with an aggregate composed of at least 20-percent noncarbonate constituents. Dolomitic aggregates were exempted. A total of 68 pavements placed in 1969 and 1970 under provisions of the new specification were skid tested in 1973, 1974, 1975, and 1979. The extent to which aggregate blending enhanced skid resistance of these pavements is evaluated. Also examined is the additional beneficiation that would result from extending the 10-percent insoluble-residue criterion to dolomitic aggregates, and from increasing the minimum blending ratio from 20:80 to 35.65.

PB80-206733 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Air Quality Considerations in Residential Planning. Volume 1. Guide for Rapid Assessment of Air Quality at Housing Sites.
Final rept.,
Richard H. Thuillier. May 78, 84p HUD-PDR-524-1, HUD-0001481
Contract HUD-H-2495
See also Volume 2, PB80-206873.

The report is designed to help the recipients of Community Development Block Grants and the appropriate HUD staff to assess air quality at the sites of new housing construction or rehabilitation and, if necessary, to take measures that will mitigate the pollution they find. This first of the three volumes is designed for routine use by the HUD appraisal staff. It presents information helpful to quick evaluation of air quality conditions at potential housing sites to determine if the national ambient air quality standards are being violated. This guide enables an environmental clearance rating to be assigned in accordance with both the normal and the special clearance procedures contained in a separate HUD handbook. Guidance is also provided for evaluating and specifying mitigating measures for situations in which air quality is only marginally acceptable. The guide outlines a procedure for collection and preparation of air quality information in the interest of the most efficient air quality assessment. Details of the assessment process are provided with streamlined instructions that refer to annotated work sheets and accompanying illustrations and monographs. Also provided is a procedure for determining and assigning a clearance rating in accordance with requirements in HUD Handbooks 1390.1 and 4010.1. The guide further presents action recommendations based on the rating assigned.

PB80-206766 PC **A03**/MF **A01**
Phoenix City Budget and Research Dept., AZ.
Cost/Revenue Analysis of the Village of Paradise Valley.
Research rept.
1 Oct 74, 41p RR-75-11, HUD-0001522

The report presents results of a cost-revenue analysis requested by the planning departments of Phoenix, AZ, for a proposed 1,200-acre Planned Area Development (PAD) in the Paradise Valley area. An economic impact study was prepared by the developer to determine the possible drawbacks and benefits of the proposed PAD. The study examined the potential costs and benefits accruing to the city if the area were developed both as presently zoned (1974) and under proposed zoning. The city's budget and research department's analysis compared the developer's report against costs and revenues generated by city departments affected by development in the study area.

PB80-206774 PC **A03**/MF **A01**
Tennessee State Planning Office, Nashville.
Urban Fringe Study, Erwin, Tennessee.
1979, 49p TN/ERNIN-7/1031, HUD-0001516
Grant HUD-CPA-TN-1031
Sponsored in part by Erwin Regional Planning Commission, TN.

The study furnishes information to help provide a better understanding of the urban fringe surrounding the town of Erwin, TN, with primary emphasis on the availability of and the need for urban services. The urban fringe around Erwin was divided into seven study areas, and the urban services were evaluated in terms of existing services or lack of them. In addition, a comparison was made with an acceptable recognized standard. Each study area is illustrated on a map and is analyzed in terms of size, topography, land use, road conditions, and the type and quality of urban services received. Urban services considered include water, refuse collection, police and fire protection, street lighting, sanitary sewers, and street maintenance. The estimated cost of providing urban services to each area along with estimated revenues from each area are also presented. Finally, basic policies needed for decisionmaking concerning the fringe areas are delineated. Tables and illustrations are provided.

PB80-206782 PC **A02**/MF **A01**
Phoenix City Budget and Research Dept., AZ.
Cost/Revenue Impact of a Proposed Northwest Annexation.
Research rept.
20 Aug 76, 19p RR-75-11, HUD-0001523

The city manager of Phoenix, AZ, requested the city's budget and research department to determine the impact on city service costs and revenues if a small area on the city's extreme northwestern boundary were to be annexed. The analysis sought to determine the direct costs that would be required to extend municipal services to the subject area and to estimate the direct and shared revenues that would accrue to the city if the area were annexed. The annexation date is assumed to be October 1, 1976.

PB80-206790 PC **A04**/MF **A01**
Tennessee State Planning Office, Nashville.
Dayton Annexation Study, Dayton, Tennessee.
Final rept.
Jun 79, 75p TN-DAYN-71031, HUD-0001517
Grant HUD-CPA-TN-1031
Sponsored in part by Dayton Regional Planning Commission, TN., and Dayton City Council, TN.

The study evaluates the feasibility of annexing the developed areas on the fringes of Dayton, TN. The proposed annexation area is divided into nine smaller study areas, which are examined in detail concerning characteristics and service requirements. The legal procedures and policy decisions involved in implementing an annexation program are considered, as well as the finances required for such a program. The proposed plan includes police and fire protection, refuse collection, street maintenance, recreational facilities, inspection and code enforcement, planning and zoning, and water and sewer systems. The study evaluates the capabilities of the city to finance the proposed improvements and expanded services. Because annexation of some of Dayton's fringe areas appears to be economically feasible, the report offers detailed recommendations for the annexation of each area.

PB80-206816 PC **A03**/MF **A01**
Tennessee State Planning Office, Nashville.
Annexation Study: Germantown, Tennessee.
Final rept.
Nov 75, 31p TN/GERN-76/1038, HUD-0001520
Grant HUD-CPA-TN-1038
Prepared in cooperation with Germantown Municipal-Regional Planning Commission, Tennessee.

The study, an analysis of the fringe areas of Germantown, Tenn., is intended to delineate those areas surrounding the city that should be annexed by 1980, based on the state of urbanization between 1975 and 1980. The study delineates three general areas proposed for annexation and subcategorizes each according to its existing or probable state of urbanization. The anticipated revenue of each area is presented, as well as the types of services necessary and their probable cost upon annexation. Finally, a recommended schedule for annexation is suggested, including a plan of services for each area to aid in city officials' decisionmaking.

PB80-206824 PC **A03**/MF **A01**
Kisatchie-Delta Regional Planning and Development District, Inc., Alexandria, LA.
Annexation Analysis: City of Ferriday.
Final rept.,
Paul E. Kent. May 79, 44p HUD-0001519
Grant HUD-CPA-LA-1083
Sponsored in part by Louisiana Department of Urban and Community Affairs, Baton Rouge. Prepared in cooperation with Ferriday Planning Commission, LA.

The report identifies and examines in detail three areas surrounding the city of Ferriday, LA., that meet the Louisiana Revised Statute requirements for annexation. Discussion focuses on some guidelines for annexation, annexation procedures, expenditure sources to be considered in annexation, additional considerations such as long-run costs of annexation, effects on individual property owners, and descriptions of the study areas. A cost-revenue analysis derived from the city's 1978-79 annual budget and conferences with local officials is also presented. Two of the study areas seem feasible for annexation because both will receive annual revenues that exceed annual costs.

PB80-206832 PC **A05**/MF **A01**
Central Midlands Regional Planning Council, Columbia, SC.
City of Cayce, SC. Fringe Area Study.
May 79, 90p HUD-0001518
Grant HUD-CPA-SC-1015

This fringe area study evaluates areas adjacent to the existing Cayce, SC, city limits for annexation potential. It is based on an analysis of costs of extending municipal services compared to anticipated municipal revenues. It examines the costs and benefits of annexation from the city's perspective and illustrates the advantages of annexation for homeowners. Municipal services provided by the city (water, sewage, garbage collection, etc.) and methods of annexation under State law are discussed. A cost/benefit analysis summary indicates that the city would lose money by annexing any of the study areas, although the development potential of each study area could increase the feasibility of annexation. In addition, homeowners could realize a number of monetary benefits upon annexation to the city.

PB80-206840 PC **A03**/MF **A01**
Genesee/Finger Lakes Regional Planning Board, Rochester, NY.
Fiscal Analysis and Improvements Program. Phase VII.
Progress rept. (Final),
Jun 75, 50p GFLRPB-NYP-1039-BSR-22, HUD-0001521
Grant HUD-CPA-NYP-1039
Prepared in cooperation with New York State Div. of Community Affairs, Rochester.

This study analyzes revenue and expenditure trends in the Genessee/Finger Lakes region of New York State over the past several years and proposes a capital improvement program (CIP) process for the region. Current revenues accruing to each county within the region are examined, and projections based on past experience are determined through 1980. Major findings from a phase I fiscal resource report indicate that revenue availability in the region will increase significantly, particularly in the rapidly climbing State and Federal aid category. Possible additional funding sources for the region would serve one of several purposes: reduce the burden on the property taxpayer, provide more equitable revenue collection, or support specific activities of the taxing jurisdiction.

PB80-206873 PC **A13**/MF **A01**
SRI International, Menlo Park, CA.
Air Quality Considerations in Residential Planning. Volume 2. Manual for Air Quality Considerations in Residential Location, Design and Construction.
Final rept.,
Richard H. Thuillier. May 78, 285p HUD-PDR-524-2, HUD-0001532
Contract HUD-H-2495
See also Volume 3, PB80-206881.

The report is designed to help the recipients of Community Development Block Grants and the appropriate HUD staff to assess air quality at the sites of new housing construction or rehabilitation and, if necessary, to take measures that will mitigate the pollution they find. The second of three volumes, this book presents a compendium of options for manual assessment of air quality conditions. Assessment procedures are applied separately to each of a number of points (receptor points) within the boundaries of the housing site where residents (receptors), especially children, the elderly, and the infirm, are likely to be exposed to air pollution. The analysis process and the format and flow of the analytical techniques themselves are described. The information requirements for a complete air quality analysis are outlined. Guidance for transforming available data types and formats into forms required for analysis input is provided. The manual also presents an efficient and orderly way to perform a number of component analyses leading to a summary of outdoor air quality at a proposed residential site. An explanation of how to interpret the results of individual analyses precedes a discussion of project design and mitigation measures, including guidance for the location, design, and construction of residential housing projects with the intention of optimizing marginal or undesirable air quality situations. Discussions deal with the problem of estimating the effects of the proposed project on the community, effects which stem from point source emissions within the community and from motor vehicle emissions from the project-generated trips.

PB80-206881 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Air Quality Considerations in Residential Planning. Volume 3. Scientific Support and Documentation.
Final rept.,
Richard H. Thuillier. May 78, 84p HUD-PDR-524-3, HUD-0001544
Contract HUD-H-2495
See also Volume 1, PB80-206733.

The report is designed to help the recipients of Community Development Block Grants and the appropriate HUD staff to assess air quality at the sites of new housing construction or rehabilitation and, if necessary, to take measures that will mitigate pollution. The third of three volumes, this manual presents scientific support and documentation for the techniques discussed in the first two volumes. The rationale for the manual assessment process is explained and the results of field verification studies are presented. The discussion of basic technical assumptions covers pollutants and pollutant source categories, types of air quality standards, and algorithmic air quality models, as well as meteorological assumptions, emission factors, and error analysis and interpretation of estimates. The manual includes a glossary, references, and an appendix on methodology testing at air monitoring sites.

PB80-206949 PC **A06**/MF **A01**
Tennessee State Planning Office, Nashville.
Fringe Area Study and Annexation Plan: Morristown, Tennessee.
Jun 76, 108p TN-MORN-76-1038, HUD-0001515
Grant HUD-CPA-TN-1038
Prepared in cooperation with Morristown Planning Dept., TN.

The fringe area study and annexation plan is intended for development of the areas adjoining Morristown, TN, which are expected to fall within the city's jurisdiction during the next 10 years. An extension of the city's comprehensive plan, it seeks to establish a 10-year growth boundary and to develop a plan for orderly growth in the fringe area. The annexation plan is aimed at implementing the findings of the fringe area study. It analyzes the effects of annexation on specific subareas and on the city as a whole, established priorities for annexation, and provides a plan for extending municipal services to the annexed areas. The community goals as set forth in the plan are to improve and expand municipal services, develop sound city government fiscal planning and operation, increase local government cooperation, harmonize environment with urban development, and achieve a functional land use arrangement. Material presented includes a description of the study area, a survey and analysis of subareas, and an analysis of the future development of fringe areas.

PB80-206972 PC **A02**/MF **A01**
Minnesota Dept. of Transportation, St. Paul.
Trends in Transportation Regulations: Rails, Buses, Trucks.
1979, 25p
Prepared in cooperation with Iowa Dept. of Transportation, Des Moines.

State transportation officials had an opportunity to meet and discuss contemporary problems at the Second Transportation Regulation Conference, co-sponsored by the Iowa and Minnesota Departments of Transportation, September 19-20, 1977. Too frequently the day-to-day work of state regulators prevent an analysis of issues affecting a state's transportation network. This conference was an attempt to bridge this gap through a series of presentations on railroads, the intercity bus industry and motor carriers. Informal discussions among the participants presented an opportunity to see how others are coping with the constantly changing and complex structure of the common carriers and their relationship to regulatory agencies.

PB80-206998 PC **A15**/MF **A01**
Pennsylvania Transportation Inst., University Park.
Review and Compilation of Demand Forecasting Experiences: An Aggregation of Estimation Procedures.
Working paper (Final),
Yupo Chan. Aug 79, 340p DOT-P-30-80-25
Contract DOT-OS-60146

It has long been recognized that there is a need in urban transportation planning for the development of a 'fast response' procedure which would allow the determination of passenger travel on an urban areawide level. This report attempts to fill this critical knowledge gap, relying heavily on the historical performance of the various elements of the urban transport planning process developed over the past two decades. Demand-forecasting experiences were collected from over 60 percent of the urban areas in the U.S. Cities were classified into four cells, based on their population size and urban structure. The delineation of the proper classification scheme was based on a statistical analysis on the base travel pattern of the various cities including their socioeconomic tabulations of demand elasticities, which are reported in conjunction with the base conditions under which they were obtained. In order to analyze the travel impacts of transportation system implementation, a detailed method of approximating the aggregate urban area total system supply curve is also presented. The city classification scheme, the tabulation of elasticities and the representation of an urban transportation system are verified through a limited number of case studies. Finally, the applications of the parameters and equations tabulated in this report are demonstrated via a step-by-step user-oriented procedure.

PB80-207616 PC **A07**/MF **A01**
Organization for Environmental Growth, Inc., Washington, DC.
A Guide to Visual Quality in Noise Barrier Design.
Implementation package (Final),
Randolph F. Blum. Dec 76, 130p FHWA-RD-IMP-77-12
Contract DOT-FH-11-8897

This publication is designed as a guide to aid individuals entrusted with the design of highway noise barriers, particularly in regard to visual quality. The guide introduces the basic principles of visual quality in general terms and illustrates the application of these basic principles to the design of highway noise barriers. The design of highway noise barriers is a process which involves a logical sequence of events including inventory, analysis, concept development, preliminary design, structural and detail design, etc. This guide indicates how visual design principles can be incorporated into this process. Highway Noise abatement measures can create visual problems due to the nature of the noise barrier and its acoustical requirements. This guide illustrates the potential visual problems created by noise barriers and identifies design measures which will minimize the visual disruption of the environment due to noise barrier construction. This guide to the basic principles which affect visual perception should serve as a tool for the designer of highway noise barriers. It is not the purpose of this publication to provide design solutions to noise abatement, but rather it is to illustrate and emphasize the need for visual quality as part of the design process. As such, the manual should be used as a supplement to technical information concerning noise abatement in an effort to produce highway noise barriers which are functional, attractive, and visually related to the surrounding environment.

PB80-207624 PC **A05**/MF **A01**
National Fire Data Center, Washington, DC.
Computers for Fire Departments: Current Technology and Typical Systems.
Nov 79, 85p

The study discusses the feasibility of using low-cost computer technology as a tool to increase the effectiveness and productivity of local fire departments. It also investigates the possibility of a nationwide uniform data system that would support the reduction of fire incidents and losses in the United States. Detailed descriptions of recent technological developments in the low cost computer area are included. Data processing requirements are also detailed. The report concludes that use of computer technology can enhance local fire department efforts in fire prevention, fire suppression and department administration.

PB80-207681 PC **A07**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
The Development and Application of a Standard Compaction-Degradation Test for Shales.
Interim rept. no. 7,
Barney C. Hale. 23 Oct 79, 147p JHRP-79-21, FHWA/IN/JHRP-79/21
Sponsored in part by Indiana State Highway Commission, Indianapolis.

Non-durable but mechanically hard shales pose a particular problem in embankment construction. These shales should ordinarily be degraded and compacted in relatively thin 'soil' lifts. However, this may be difficult to accomplish because of the shale hardness. The engineer obviously needs to anticipate the difficulty of degrading the shale during construction, and this research has produced a simple standard test for such prediction. The standard AASHTO impact type test can be used to generate compaction relationships and degradability measures simultaneously. The shale gradation before and after compaction is used to generate an index of crushing. Degradation varies directly with this index. It may ultimately be possible to use the more simple point load strength test to accomplish the prediction. This report shows good correlation between the secant modulus in the point load strength test and the index of crushing.

PB80-207871 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Pedestrian Behavior and Bicycle Traffic,
Margaret Hubbard Jones, Charles V. Zegeer, Dennis A. Randolph, Mark A. Flak, and Rathi K. Bhatacharya. 1980, 57p TRB/TRR-743, ISBN-0-309-03051-X
Library of Congress catalog card no. 80-19207. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- Measuring pedestrian behavior;
- Use of pedestrian conflict analyses for hazard assessment in school zones;
- Development of a conflicts analysis technique for pedestrian crossings;
- Causal factors of non-motor-vehicle-related bicycle accidents;
- Determination of the characteristics of bicycle traffic at urban intersections;
- Strategies for increasing levels of walking and bicycling for utilitarian purposes.

PB80-208374 PC **A05**/MF **A01**
ROMCOE, Boulder, CO.
The Regulatory Reform Workshop Held at Boulder, Colorado on February 13-15, 1980.
May 80, 98p AQ-7395-7
Contract 7-AQ-7395

This NCAQ-sponsored workshop investigated alternative approaches to the process of issuing permits for new or modified sources of air pollution. Individuals familiar with the air quality permitting process from industry, government and environmental organizations participated. The groups suggested different sets of requirements based upon source size; clarification of modeling and monitoring requirements; rapid completion of State Implementation Plan process; and possible funding for public participation.

PB80-208382 PC **A04**/MF **A01**
Deane, Snowdon, Shutler, Garrish and Gherardi, Washington, DC.
Report of the Photochemical Oxidant Panel to the National Commission on Air Quality.
Final rept.,
Norman D. Shutler. May 80, 69p AQ-7366-4
Contract 4-AQ-7366

The Photochemical Oxidant Review Panel assembled by the National Commission on Air Quality met in January, 1980 to provide advice and develop recommendations to the Commission with respect to the formation and control of photochemical oxidants (ozone). The Panel considered these issues: the natural sources of ozone and its precursors, transport of ozone and its precursors, optimum HC/NOx controls, methods for assessing ozone/precursor relationships, priority areas for research and development, and geographical regions of the country which should be research priorities.

PB80-208622 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Statistical Methods for Passive Vehicle Classification in Urban Traffic Surveillance and Control.
Final rept. Apr 78-Apr 79,
Paul K. Houpt. Jun 80, 83p DOT-TSC-RSPA-80-13
Contract DOT-TSC-1685

A statistical approach to passive vehicle classification using the phase-shift signature from electromagnetic presence-type vehicle detectors is developed with digitized samples of the analog phase-shift signature, the problem of classifying vehicle type is formulated as a problem in classical maximum likelihood hypothesis testing. Computer algorithms for performing classification are developed and evaluated using data from ten different vehicle types. Simulation of the algorithms using these data has shown very favorable detection performance over a wide range of signal-to-noise ratio with high detection probabilities and low frequency of misclassification. A methodology for algorithm simplification and calibration is proposed which may permit implementation on simple (e.g., microprocessor based) signal-processing hardware.

PB80-208937 PC **A09**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Determining the Inland Extent of Hawaii's CZM (Coastal Zone Management) Boundaries.
Technical supplement,
Brian Nishimura. Sep 78, 177p TS-14, NOAA-80061204
Prepared in cooperation with Hawaii Univ., Honolulu. Pacific Urban Studies and Planning Program. See also report dated Sep 78, PB80-208929, and Technical supplement 11, PB-255 346.

The purpose of this paper is to provide a technical foundation upon which to establish the criteria for determining the state's inland Coastal Zone Management boundaries. First a historical perspective of both the development of the federal and Hawaii state CZM programs and the evolution of the inland boundary issue is presented.

PB80-209067 PC **A03**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Problems of Regulatory Inefficiency and Issues to be Considered in Reducing Them.
Technical supplement,
John Holmstrom. Jan 80, 30p TS-15, NOAA-80061205
Grant NOAA-04-8-M01-333
See also Technical supplement 11, PB-255 346. Preparation with Hawaii Univ., Honolulu.

The purpose of this paper is to provide a conceptual framework for those individuals and agencies who are interested in the development of 'permit coordination' or 'permit simplication' programs. The immediate objective is to develop a strategy for making regulatory processes in Hawaii more efficient. The observations made are based primarily on regulatory experience in Hawaii, although the discussion refers to mechanisms which have been employed or proposed in other jurisdictions for accomplishing the same task.

PB80-209422 PC **A04**/MF **A01**
Oklahoma City Office of Research and Economic Development, OK.
Comprehensive Economic Adjustment Strategy for Stockyards-Capitol Hill Area, City of Oklahoma City, Oklahoma. Volume I. Adjustment Strategy Summary.
Jul 80, 59p EDA-80-0104
See also Volume 2, PB80-209430.

Long-term objectives of the adjustment strategy are to develop new economic employment opportunities through the development of new light industry and the potential development of recreational and tourism facilities. As a result of the in-depth study of the area, a comprehensive adjustment strategy has been developed which provides for both the short term and the long term economic development of the District. The strategy will provide the needed financial assistance to mitigate the impact of the greatly increased wastewater discharges, thereby saving some 1800 direct employment opportunities.

PB80-209430 PC **A16**/MF **A01**
Oklahoma City Office of Research and Development, OK.
Comprehensive Economic Adjustment Strategy for the Stockyards-Capitol Hill Area, Oklahoma City, Oklahoma. Volume 2. Supporting Documentation. Annex I, Annex II, and Annex III.
Jul 80, 374p EDA-80-0105
See also Volume 1, PB80-209422. Prepared by Painter and Spitz Consultants, Inc., Oklahoma City, OK.

Twenty six industries were initially identified by the City of Oklahoma City for inclusion in the Stockyards Area Industrial Wastewater Treatment Study. This Volume II, reports on the food processing industry in Oklahoma City centered in the Stockyards Area.

PB80-209554 PC **A03**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Hawaii's Efforts Toward A Coordinated Regulatory Process for Land Development.
Technical supplement,
Earl K. Matsukawa, and Robert A. Alm. Jan 80, 42p TS-16, NOAA-80061206
Grant NOAA-04-8-M01-333
Prepared in cooperation with Hawaii Univ., Honolulu.

The governmental and private sectors have initiated efforts to alleviate procedural problems caused by complex development review systems. This nationwide interest in regulatory simplification has also been reflected in Hawaii. This paper reviews the progress which has been made and, based on this review, offers some considerations for future efforts. Part I of this paper is a synopsis of Hawaii's major permit simplification efforts. It identifies and describes the major proposals as well as adopted and implemented reforms. Part II views Hawaii's permit simplification efforts in relation to the range of alternative techniques available to alleviate specific types of regulatory problems. The Purpose of the Part is to broaden the context in which to view alternative techniques. Part III looks at implementation of permit simplification measures in Hawaii and offers some considerations for future efforts.

PB80-209562 PC **A04**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
A Survey of States' Efforts to Improve Land Development Review Procedures.
Technical supplement,
Robert A. Alm, and Annette Kolis. Jan 80, 74p TS-17, NOAA-80061207
Grant NOAA-04-8-M01-333
Prepared in cooperation with Hawaii Univ., Honolulu.

Concern for the environment in the late 1960s and early 1970s led to the passage of significant federal, state and local legislation. While this legislation has produced a comprehensive system of environ-

mental protection, it has also produced what many see as a collection of fragmented, overlapping and overly-complex controls on new development. This paper examines state legislative reform efforts with the intent of providing a summary which will be useful to those interested in reforming the regulatory system for land development.

PB80-209570 PC **A03**/MF **A01**
Hawaii State Dept. of Planning and Economic Development, Honolulu.
The Federal Dredge and Fill Permit Program and Its Application to Hawaii.
Technical supplement,
Debbi L. Klopmen. Jan 80, 29p TS-19, NOAA-80061209
Prepared in cooperation with Washington Univ., Seattle. School of Law.

This report reviews the dredge and fill permit program authorized by the Federal Water Pollution Control Act (FWPCA), as initially enacted in 1972 and as subsequently amended in 1977. Review of the original legislation includes discussions in five areas.

PB80-210867 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Office of Coastal Zone Management.
Report to the Congress on Coastal Zone Management. Fiscal Year 1978.
Jan 79, 105p NOAA-80061104
See also report Jan 79, PB-298 537.

This annual report on the administration of the Coastal Zone Management Act of 1972 presents the highlights for the 12 months ending September 30, 1978. Thirteen States have made substantial progress in developing useful coastal management efforts, in part because some of these States already had enacted some type of coastal program by the time the Federal program was begun. In 12 other States and territories, the Federal program, with its grants-in-aid and other incentives, has led to the development of a comprehensive approach in dealing with coastal resource use and protection.

PB80-211097 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Bus Transit Management and Performance,
William P. McShane, Paul Menaker, Roger P. Roess, John C. Falcocchio, and William G. Allen, Jr. 1980, 73p TRB/TRR-746, ISBN-0-309-03055-2
Library of Congress catalog card no. 80-19208.
Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The 13 papers in this report deal with the following areas: transit ridership in an intense transit environment: some observations; development and application of performance measures for a medium-sized transit system; diagnostic tools in transit management; portfolio model of resource allocation for the transit firm; evaluating potential effectiveness of headway control strategies for transit systems; what public transportation management should know about possible user reactions, as shown by the example of price sensitivity; use of federal section 15 data in transit performance evaluation: Michigan program (abridgment); systematic procedure for analysis of bus garage locations; initial reactions to a central business district bus transit mall in Honolulu; recent experience with accessible bus services; operational improvements in a two-city bus transit corridor (abridgment); note on bus route extensions (abridgment); and hierarchical procedures for determining vehicle and crew requirements for mass transit systems.

PB80-212673 PC **A12**/MF **A01**
Office of Radiation Programs, Washington, DC. Surveillance and Emergency Preparedness Div.
Evaluation of Health and Environmental Effects of Extra High Voltage (EHV) Transmission.
Final rept.
Jun 80, 254p ORP/SEPD-80-13

In March 1975 to respond to concerns about the possible adverse health and environmental effects of Extra High Voltage (EHV) transmission lines, the Environmental Protection Agency requested data and information from the public (through a Federal Register Notice) on the health and environmental effects of 60 Hz transmission lines energized at 700 kV or higher. A review and analyses of more than 50 replies totaling over 6,000 pages is presented in this document.

PB80-813074 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hazardous Materials Transportation: General Studies. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Guy E. Habercom, Jr. Jul 80, 350p
Supersedes NTIS/PS-79/0703 and NTIS/PS-78/0553.

The transportation of explosives, rocket propellants, pesticides, chemical warfare agents, industrial chemicals, liquified natural gas, chlorine, and other hazardous materials are covered. All means of transportation are described. Accidents, injuries, explosions, and spills involving these materials are covered. Material testing and safety equipment are discussed. Economics and statistics of hazardous material transportation are included. Radioactive wastes and materials are excluded. (This updated bibliography contains 346 citations, 33 of which are new entries to the previous edition.)

PB80-813082 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hazardous Materials Transportation. 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jun 80,
Guy E. Habercom, Jr. Jul 80, 267p
Supersedes NTIS/PS-79/0705, and NTIS/PS-78/0555.

Worldwide journal research is cited on transportation of hazardous chemicals, gases, and explosives. The majority of studies concern liquified natural gas transportation. Tanker ships, containers, and pipelines for these materials are discussed. Descriptions of accidents, spills, handling, loading, and equipment design are covered. Mathematical models and simulations are included. (This updated bibliography contains 263 citations, 25 of which are new additions to the previous edition.)

13C. Construction Equipment Materials, and Supplies

AD-A950 003/4 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Tests of Sanded Grouts. Report Number 1. Influence of Chemicals and Mineral Fines on Pumpability.
Technical memo.,
Thomas B. Kennedy, and James M. Polatty. Oct 55, 28p Rept no. WES-TM-6-419-1
See also Rept. no. 2, AD-A950 004.

No abstract available.

AD-A950 004/2 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Tests of Sanded Grouts. Report Number 2. Influence of Sand Grading and Addition of Mineral Fines on Pumpability.
Technical memo.,
James M. Polatty. Oct 55, 20p Rept no. WES-TM-6-419-2
See also Rept. no. 3, AD-B951 760.

No abstract available.

13D. Containers and Packaging

AD-A087 351/3 MF **A01**
Army Missile Command Redstone Arsenal AL Ground Equipment and Missile Structures Directorate
A Methodology for Modeling Confined, Temperature Sensitive Cushioning Systems.
Technical rept.,
Virginia P. Kobler. Jun 80, 164p DRSMI/RL-80-10, AD-E950 004
Availability: Microfiche copies only.

A methodology for modeling the impact response of a confined cushioning system has been demonstrated. Data for modeling were acquired from test drops made with a test specimen comprised of a plywood cube (protected item) within a cleated plywood shipping container, under controlled environmental conditions, utilizing 2-inch Minicel as the cushioning system. Individual curves were developed for each temperature and drop height for both the interior box and total container system. Utilizing a stepwise regression procedure, a general model was developed for the interior box and also for the total container system. The general model permits the cushion designer to predict the impact response of a container system within drop heights of 12 to 30 inches, a temperature range of -65 F to 160 F, and a static stress range of 0.088 to 1.255 psi. (Author)

13E. Couplings, Fittings, Fasteners, and Joints

AD-A087 218/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Stress Concentrations in Screw Threads.
Technical rept.,
G. P. O'Hara. Apr 80, 43p ARLCB-TR-80010, AD-E440 073
Presented at NASTRAN Users' Colloquium (8th), Greenbelt, MD., Oct 79.

The concept of stress concentration in screw threads is defined as a ratio of maximum fillet stress normalized to shear transfer rate. The data is presented as a plot of fillet stress vs. radial stress for a particular thread form. The Heywood equation is used to generate the basic plots and NASTRAN is used to extend the analysis to the case both where flanks of an individual thread tooth are in contact and the case where a finite axial stress is superimposed.

AD-A087 280/4 PC **A09**/MF **A01**
General Dynamics Corp Fort Worth TX Fort Worth Div
Fatigue Behavior of Adhesively Bonded Joints. Volume I.
Final technical rept. Jul 76-Apr 80,
John Romanko, and W. G. Knauss. Apr 80, 193p AFWAL-TR-80-4037-VOL-1
Contract F33615-76-C-5220
See also Volume 2, AD-A087 360.

The fatigue behavior of adhesively bonded aluminum joints was investigated analytically and experimentally. Stress distributions in the adhesive interlayer were calculated to guide planning of the joint tests and the interpretation of the test results. Finite element stress analyses were conducted using a linear elastic, and a three-element linear viscoelastic model for the adhesive behavior. Thick adherend lap-shear specimens of the model joint configuration were fabricated and tested. These specimens were instrumented and subjected to sinusoidal fatigue tests at several frequencies, humidities and temperatures. Certain tests were interrupted at various stages and the specimens examined for fatigue damage. Damage was found to initiate in the (calculated) high stress regions, and to propagate with further load cycling. Observations and recommendations resulting from the investigation are included in this final report. (Author)

AD-A087 360/4 PC **A05**/MF **A01**
General Dynamics Corp Fort Worth TX Fort Worth Div
Fatigue Behavior of Adhesively Bonded Joints. Volume II. Appendices.
Final technical rept. Jul 76-Apr 80,
John Romanko, and W. G. Knauss. Apr 80, 78p
AFWAL-TR-80-4037-VOL-2
Contract F33615-76-C-5220
See also Volume 1, AD-A087 280.

The fatigue behavior of adhesively bonded aluminum joints was investigated analytically and experimentally. Stress distributions in the adhesive interlayer were calculated to guide planning of the joint tests and the interpretation of the test results. Finite element stress analyses were conducted using a linear elastic, and a three-element linear viscoelastic model for the adhesive behavior. Thick adherend lap-shear specimens of the model joint configuration were fabricated and tested. These specimens were instrumented and subjected to sinusoidal fatigue tests at several frequencies, humidities and temperatures. Certain tests were interrupted at various stages and the specimens examined for fatigue damage. Damage was found to initiate in the (calculated) high stress regions, and to propagate with further load cycling. Observations and recommendations resulting from the investigation are included in this final report. (Author)

PATENT-4 184 665
Not available NTIS
Department of Energy, Washington, DC.
Thermally Actuated Wedge Block.
Patent,
C. C. Queen, Jr. Filed 8 Dec 78, patented 22 Jan 80, 4p PAT-APPL-967 665
Supersedes PAT-APPL-967 665-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to an automatically-operating wedge block for maintaining intimate structural contact over wide temperature ranges, including cryogenic use. The wedging action depends on the relative thermal expansion of two materials having very different coefficients of thermal expansion. The wedge block expands in thickness when cooled to cryogenic temperatures and contracts in thickness when returned to room temperature. (ERA citation 05:029956)

13F. Ground Transportation Equipment

PB80-188428 PC **A04**/MF **A01**
Calspan Advanced Technology Center, Buffalo, NY.
Calspan/Chrysler Research Safety Vehicle. Phase III, Final Technical Report. Volume I. Executive Summary.
Final rept.,
G. J. Fabian. Apr 80, 62p CALSPAN-ZN-6069-V-32-1, DOT-HS-805-322
Contract DOT-HS-7-01551

In Phase III of the RSV program, the Phase II design of subsystems and components was refined and adapted to exemplify mass production techniques. This report summarizes the integration of the various elements into a coordinated design from which ten vehicles were fabricated for test and evaluation by others in Phase IV. The five-passenger family car is designed to be fabricated by mass production techniques from materials chosen to minimize energy content, rare mineral requirements, and facilitate recycling for recovery and reuse. Using a combination of mathematical modeling on the computer with static and dynamic testing, design issues that remained at the completion of Phase II were resolved; validation tests were conducted to demonstrate performance resulting from these design improvements; and the results were incorporated in the final design. Additional investigations defined emissions and fuel economy, documented the degree of RSV compliance with current Federal Motor Vehicle Standards, and studied the effect of the RSV design on collision repair, producibility, and cost of program goals.

PB80-205644 PC **A03**/MF **A01**
Department of Transportation, Washington, DC. Research and Special Programs Administration.
The Opportunity for Advanced Ground Transportation Systems.
Final rept.,
J. Ward, B. Bartholow, and S. Chu. Sep 79, 50p
DOT-RSPA-DPB-20-79-4

This report presents the results of an internal staff analysis of socio-economic trends which influence future transportation requirements. The objective of the analyses was to identify the potential opportunity for new ground transportation systems based on non-contacting suspension and propulsion technologies. These technologies are suitable for the development of a new higher speed intercity system but may also be useful in developing more acceptable, lower cost urban/regional systems. Current trends in population, income and travel suggest that transportation demand is likely to double by the year 2000. New transportation capacity will be required; however, the role for fixed guideway systems will depend on the available energy supply, the ability to aggregate traffic and the desirability of an alternative to continued expansion of the highway and air systems.

PB80-207061 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 1. User's Guide for the Five Degree of Freedom Models.
Final rept. 30 Sep 77-30 Apr 80,
B. Mitchell, R. Abrams, and R. A. Scott. 30 May 79, 38p DOT-HS-805-362
Contract DOT-HS-7-01715
See also Volume 2, PB80-207079.

The report contains directions on how to operate the digital programs SLABAM and SLABIM. Both programs involve five-degree-of-freedom vehicle models and are designed to simulate straight line braking and acceleration maneuvers.

PB80-207079 PC **A12**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 2. Programmers' Guide for the Five Degree of Freedom Models.
Final rept. 30 Sep 77-30 Apr 80,
B. Mitchell, R. Abrams, and R. A. Scott. 30 May 79, 265p DOT-HS-805-363
Contract DOT-HS-7-01715
See also Volume 1, PB80-207061, and Volume 3, PB80-207087.

The aim of this report is to provide sufficient documentation on the digital programs SLABAM and SLABIM as to enable them to be altered readily. Both programs involve five-degree-of-freedom vehicle models and are designed to simulate straight line braking and acceleration maneuvers.

PB80-207087 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 3. Technical Manual for the Five Degree of Freedom Models.
Final rept. 30 Sep 77-30 Apr 80,
B. Mitchell, and R. A. Scott. 1 Mar 80, 56p DOT-HS-805-364
Contract DOT-HS-7-01715
See also Volume 2, PB80-207079, and Volume 4, PB80-207095.

The volume is the Technical Manual for the Five-Degree-of-Freedom-Models and in it mathematical modelling of the vehicle is presented in detail. Information on model validation and operating costs are presented, as well as samples and analyses of simulation output.

PB80-207095 PC **A08**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 4. Users' Guide for the General Simulation.
Final rept. 30 Sep 77-30 Apr 80,
W. R. Garrott, D. L. Wilson, A. M. White, and R. A. Scott. 15 Jul 79, 160p DOT-HS-805-365
Contract DOT-HS-7-01715
See also Volume 3, PB80-207087, and Volume 6, PB80-207103.

A basic goal of the project was to create an all digital simulation for vehicle handling capable of handling both open-loop and closed-loop maneuvers up to and including the limit regime. Another goal was extensive modularization, so that difficulties in possible future program development would be minimized. The simulation consists of two main parts, namely, a vehicle model called IDSFC and a general purpose driver module called DRIVER. Interfacing between the driver module and the vehicle model is handled by 3 subroutines which can be readily altered to use the driver module with different vehicle models.

PB80-207103 PC **A17**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 6. Programmers' Guide for the DRIVER MODULE.
Final rept. 30 Sep 77-30 Apr 80,
R. Garrott, D. Wilson, A. White, and R. A. Scott. 30 Dec 79, 400p DOT-HS-805-369
Contract DOT-HS-7-01715
See also Volume 4, PB80-207095, and Volume 7, PB80-207111.

The goal of the report is to provide sufficient documentation on the DRIVER MODULE as to enable it to be altered readily, if desired.

PB80-207111 PC **A13**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 7. Technical Manual for the General Simulation.
Final rept. 30 Sep 77-30 Apr 80,
W. R. Garrott, and R. A. Scott. 1 Mar 80, 280p DOT-HS-805-370
Contract DOT-HS-7-01715
See also Volume 6, PB80-207103, and Volume 8, PB80-207129.

This volume is the technical manual for the general simulation. Mathematical modelling of the vehicle and of the human driver is presented in detail, as are differences between the APL simulation and the current one. Information on model validation and operating costs are also given. A comparison between two mathematical models of tire behavior is made. Extensive output for open and closed loop maneuvers is presented and analyzed.

PB80-207129 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Coll. of Engineering.
Improvement of Mathematical Models for Simulation of Vehicle Handling. Volume 8. Summary Report.
Final rept. 30 Sep 77-30 Apr 80,
W. R. Garrott, and R. A. Scott. 1 Mar 80, 17p DOT-HS-805-371
Contract DOT-HS-7-01715
See also Volume 1, PB80-207061.

Major objectives of the study were as follows: To develop an all digital vehicle simulation for handling and braking; To develop a human driver simulation for evaluating handling capabilities of closed loop vehicle-driver systems; and to investigate methods for describing the directional stability and control of automobiles applicable to nonlinear transient response.

PB80-207855 PC **A07**/MF **A01**
Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.
Track and Bridge Maintenance Research Requirements.
Final rept.,
Reece H. Wengenroth, and Harry P. Clapp. Mar 80, 140p FRA/ORD-80/11
Contract DOT-FR-8071

This report includes the design of seven research plans in the area of track and bridge maintenance. The railroad industry was surveyed to ascertain the maintenance problems of their greatest concern which lend themselves to resolution by research. The problems uncovered in the survey were ranked based upon the opinion of the industry and

the following seven of the top ranked problem categories were selected for the development of research plans: bridge inspection, rating and evaluation of remaining life; subgrade stabilization and improvement; timber cross tie rehabilitation and disposal; special trackwork maintenance; bolted joints; ballast fouling from external sources; and switch point wear limits.

PB80-207947 PC **A11**/MF **A01**
Falcon Research and Development Co., Buffalo, NY.
Study of Automotive Emission Control Technology: Fuel Switching Analysis.
Interim rept. no. 5 (Final).
30 Jun 80, 236p AQ-7243-2E
Contract 2-AQ-7243
Prepared in cooperation with Energy and Environmental Analysis, Inc., Arlington, VA.

This interim report examines the emissions impact of fuel switching on operating vehicles designed to use unleaded gasoline or leaded gasoline, one of the major factors responsible for the failure of in-use vehicles to meet emission standards. An analysis is made of the number of vehicles subject to fuel switching, the frequency at which it occurs, and the impact on individual vehicle emissions. A methodology is developed for predicting the total vehicle emissions impact of fuel switching, and projections are made of the increase in vehicle emissions from 1975 through 1990.

PB80-207954 PC **A08**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
FMVSS 212/219/301 Testing of Electric Vehicles South Coast Technology-Electric VW (Volkswagen) Rabbit; Battronics Van.
Final rept.,
Mark Pozzi. Nov 79, 156p 3042-79-186/1540, DOT-HS-805 402
Contract DOT-HS-5-01104

The report presents the results of two electric vehicle-to-barrier head-on crash tests. These tests were conducted to determine if the vehicles would comply with the fuel spillage requirements of federal Motor Vehicle Safety Standard (FMVSS) 301, Fuel System Integrity, the windshield retention requirements of FMVSS 212, and the windshield zone intrusion requirements of FMVSS 219. The standard fixed barrier was replaced by the NHTSA Fixed Test Device with 40 load cells for the SCT Rabbit crash test. The electric vehicles tested in this report were the SCT Electric Rabbit, manufactured by South Coast Technology, Inc., Goleta, California; and the Battronics Van, manufactured by Battronic Truck Corporation, Boyerstown, Pennsylvania.

PB80-209034 PC **A11**/MF **A01**
Hamilton Test Systems, Inc., Phoenix, AZ.
Portland Study Element II. I/M Effectiveness Study.
Final rept.,
David A. Smith. May 79, 233p EPA-460/3-79-003
Contract EPA-68-03-2513
See also report dated Mar 79, PB80-151210.

An exhaust emissions test program was conducted in Portland, Oregon on a sample of privately-owned 1972-77 model year automobiles. The objective of the study was to collect data on the effectiveness of a mandatory vehicle exhaust inspection/maintenance (I/M) program. Cars were recruited from Portland, where they are subject to the Oregon vehicle inspection program, and from Eugene, where they are not. The Eugene cars thus served as the experimental control. The Portland and Eugene fleets were identical in make, model, and model year mix, both representative of the Oregon automobile population of the model years tested. The Portland fleet consisted of equal numbers of cars passing and failing the state inspection when initially recruited. Each car was tested in as-received condition, initially and at 3-month intervals for a year. Portland fail cars were also tested after maintenance. The test sequence included the state idle test, two Federal short tests, the 75 FTP, and the Highway Fuel Economy Test. Complete engine diagnostic checks and owner interviews regarding maintenance were also conducted at each sequence. Emissions and fuel economy data are presented for all tests on every car in the program.

PB80-210172 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Railroad Track and Facilities,
Allan M. Zarembski, M. B. Hargrove, F. S. Mitchell, R. K. Steele, and R. E. Young. 1980, 74p TRB/TRR-744, ISBN-0-309-03052-8
Library of Congress catalog card no. 80-18849. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- Rail research--meeting the challenge of modern traffic loading;
- Evaluation of rail behavior at the facility for accelerated service testing;
- Deformation behavior of rail steels;
- Nondestructive testing of railroad rail;
- Review of rail research on british rail;
- Dilemma of direct-fixation fastening systems;
- Comparison of performance of wood-tie fasteners at fast;
- Development of an analytical approach to track maintenance planning;
- Profile--gradient simulation for rail hump classification yards;
- Conflicts between urban areas and railroads--a status report.

13H. Industrial Processes

AED-CONF-78-155-059 PC **A02**/MF **A01**
Energopomiar, Gliwice (Poland).
Technical Services for Power Plants and Energetic Objects.
J. Cieplak, H. Kuszke, Z. Rozewicz, and A. Suchorab. 1978, 21p CONF-7804102-27
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

The paper gives a survey of organization, services, and tasks of ENERGOPOMIAR, a measurement and research institution directly subordinate to the Minister for Energetics and Atomic Energy. The institution has great authority in the field of quality control of machinery and equipment as well as in the field of operating problems and expert opinions. An appendix lists selected domestic and foreign power plants and stations for which ENERGOPOMIAR has carried out the work described in the article. (ERA citation 04:033764)

PB80-209612 PC **A10**/MF **A01**
Institute of Electrical and Electronics Engineers, Inc., New York.
Industrial Applications of Magnetic Separation,
Y. A. Liu. c1979, 205p IEEE-78CH1447-2, NSF/RA-790086
Grants NSF-DAR78-16310, DOE-ET-78-G-01-3255
Proceedings of an International Conference held at Franklin Pierce College, Rindge, New Hampshire, July 30-August 4, 1978. Prepared in cooperation with Auburn Univ., AL. Sponsored in part by Electric Power Research Inst., Palo Alto, CA., and Gulf Oil Foundation. Library of Congress catalog card no. 78-84522.

The conference convened to provide opportunities for researchers and practitioners to exchange the latest information on research and development in magnetic separation, emphasizing the existing and potential industrial applications of magnetic separation to coal desulfurization, mineral beneficiation, water treatment, particulate control, blood processing, resource recovery, and chemical processing. One hundred and ten participants from the U.S. and ten foreign countries attended the conference. Manuscripts and/or summaries of 42 papers are contained in this volume, organized into three sections: magnetic separation - general features, equipment design, and development; existing and potential applications of magnetic separation - new applications, mineral processing, coal desulfurization, and water treatment; and fundamental studies of magnetic separation. The conference was sponsored by the Engineering Foundation, Auburn University and the IEEE Magnetics Society.

13I. Machinery and Tools

AD-A087 400/8 PC **A08**/MF **A01**
Columbia Univ New York Tribology and Lubrication Research Lab
Experimental Investigation of Hydrodynamic Self-Acting Gas Bearings at High Knudsen Numbers.
Rept. no. 28 (Final) 1977-1980,
Yiao-Tee Hsia, and Gerald A. Domoto. 1 Jul 80, 156p
Contract N00014-75-C-0552

This investigation gives experimental confirmation of the 'slip flow' theory, developed by Burgdorfer, for modelling hydrodynamic gas bearing with clearances below 0.25 micrometers. An interferometric technique using two CW lasers is used to measure the small clearances with an 0.025 micrometers accuracy. The pitch and roll angles of the slider bearing and the surface contour of the slider are also measured interferometrically. The effects of molecular rarefaction are studied by operating the bearing in different gas media with different mean free paths. Air is used to study Knudsen number below 0.5 while helium is used to study Knudsen number above 0.5. Experimentally measured trailing edge clearances and pitch angles are compared with theoretical predictions using the 'modified' Reynolds equation with velocity slip boundary conditions. The modified Reynolds equation is solved numerically using two different numerical algorithms. Excellent agreement between experiment and theory is found for clearances as high as 1.60 micrometers to as low as 0.075 micrometers with corresponding ambient Knudsen number of 0.04 and 2.51, respectively. (Author)

PATENT-4 188 118
Not available NTIS
Department of Energy, Washington, DC.
Manipulator for Rotating and Examining Small Spheres.
Patent,
B. W. Weinstein, and D. L. Willenborg. Filed 17 May 78, patented 12 Feb 80, 6p PAT-APPL-906 815
Supersedes PAT-APPL-906 815-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A manipulator which provides fast, accurate rotational positioning of a small sphere, such as an inertial confinement fusion target, which allows inspecting of the entire surface of the sphere is described. The sphere is held between two flat, flexible tips which move equal amounts in opposite directions. This provides rolling of the ball about two orthogonal axes without any overall translation. The manipulator may be controlled, for example, by an x- and y-axis driven controlled by a mini-computer which can be programmed to generate any desired scan pattern. (ERA citation 05:031396)

PATENT-4 189 122
Not available NTIS
Department of the Navy Washington DC
Wide Angle Gimbal System.
Patent,
Samuel A. Miller. Filed 21 Jul 78, patented 19 Feb 80, 4p AD-D007 387/4, PAT-APPL-926 700
Supersedes PAT-APPL-926 700-78, AD-D005 310.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for mounting a gimbal assembly expands the range of angular motion of the gimbals and permits direct connections to the gimbals. Two counter rotating members between the mounting base and the gimbal assembly change the spatial orientation of the plane on which the gimbal assembly is mounted without rotating the plane. (Author)

13J. Marine Engineering

AD-A086 973/5 MF **A01**
Coast Guard Washington DC
Commandant's International Technical Series. Volume VII. Regulations and Guidelines for Inert Gas Systems.
Final rept.
Apr 80, 113p Rept no. USCG-CITS-80-1-1
See also Volume 6, AD-A028 791.
Availability: Microfiche copies only.

This report is concerned with a new international regulation on inert gas systems for tank vessels, adopted in November 1979 by the Assembly of the intergovernmental Maritime Consultative Organization (IMCO). This regulation is the result of several years of study internationally by the IMCO Subcommittee on Fire Protection, in which some 20 countries participated. In addition, Guidelines which are recommended to governments when fitting inert gas systems in tank vessels in accordance with Regulation 62 of Chapter II-2 of SOLAR 1974 are attached. A third attachment represents the findings by the National Materials Advisory Board concerning material aspects of inert gas systems. (Author)

AD-A087 015/4 PC **A15**/MF **A01**
National Research Council Washington DC Maritime Transportation Research Board
Defense Utility of Commercial Vessels and Craft.
Final rept.,
John F. Wing, and S. Lynn Walton. 1980, 345p
Contract N00014-75-C-0711

This report identifies military functions, required in an emergency or mobilization, whose performance may require the use of vessels and craft that normally are not included in contingency planning; and describes the types, characteristics, and potential availability of vessels and craft that appear to have utility for these functions. Its scope excludes vessels owned or operated by the Department of Defense and the Coast Guard; oceangoing commercial cargo ships, which already are included in national contingency planning; and foreign-owned vessels. Vessel types included are: ocean-classed tugs, ocean-classed barges, crane and derrick barges, offshore service and supply vessels, drillships and semisubmersibles, five categories of fishing vessels, oceanographic research vessels, dredges, floating drydocks, motor yachts, passenger-vehicle ferries, marine salvage vessels, and advanced marine vehicles (air cushion vehicles, surface effect ships, and hydrofoils). The report identifies 13 general military functions that could be filled in whole or in part by the 17 types of vessels studied and provides 8 basic information sources to military planners and industry personnel.

AD-A087 281/2 PC **A03**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Thrusting Characteristics of Propulsors.
Technical memo.,
W. S. Gearhart, and E. P. Bruce. 30 May 80, 33p
Rept no. ARL/PSU/TM-80-118
Contract N00024-79-C-6043

The function of any propulsive system, is to provide a forward thrust along its axis. The design objective is to obtain a maximum in propulsor thrust with a minimum of shaft power while satisfying practical limits of propulsor size, shaft speed, and cavitation resistance. The generation of thrust requires that some kinetic energy be lost in the propulsive slipstream. These losses are associated with both axial and rotational velocity components in the slipstream. In addition, the presence of rotational velocity in the slipstream results in a low pressure region in the far wake which reduces the net effective thrust generated by the propulsor. It has been the tradition of the propulsor designer to neglect the rotational effects, other than considering the kinetic energy losses, since it is assumed that the rotational component of velocity in the far wake is small. This assumption is valid for propulsors that ingest large mass flows and place a small amount of energy per unit mass in the flow. However, the trend now is toward more heavily loaded propulsors, both of the open or ducted type. Thus, a reevaluation of the relative magnitudes of the losses associated with the velocity components in the propulsive slipstream is necessary. It is the intent of this paper to evaluate, for a given shaft power, the relative losses in propulsor thrust associated with the axial and rotational velocity components in the slipstream.

AD-A087 282/0 PC **A09**/MF **A01**
Energy Analysts Inc Norman OK
Cargo Fire Hazards and Hazard Control for the Offshore Bulk Fuel Systems (OBFS).
Final rept. Aug 79-Jan 80.
Jun 80, 185p CEL-CR-80.016
Contract N68305-79-C-0021

This study evaluates potential cargo fuel spills, spill fires and equipment available to mitigate fuel spill hazards at an off-shore bulk fuel supply installation. Potential cargo spill sources, probabilities and volumes are calculated. Consequences of these spills assuming spill ignition are quantified. Existing fire protection equipment aboard tankers is evaluated to determine the ability of this equipment to control identified spill fire conditions. Where existing fire fighting systems are found to be inadequate additional fire mitigation systems are recommended. Logistic support, manpower and training needed to maintain the recommended spill control systems are detailed. (Author)

AD-A087 307/5 PC **A02**/MF **A01**
System Planning Corp Arlington VA
An Assessment of Small Submarines and Encapsulation of Ballistic Missiles. Phase I. Executive Summary.
Final rept.
May 80, 21p Rept no. SPC-554
Contract N00014-79-C-0304
See also AD-C021 670.

This document presents an unclassified version of the Executive Summary from SPC Final Report 554 entitled An Assessment of Small Submarines and Encapsulation of Ballistic Missile--Phase I (U). This report documented the results of a classified study performed by System Planning Corporation (study director), the Naval Sea Systems Command, and Lockheed Missiles and Space Company for the Chief of Naval Operations. The unclassified Executive Summary is intended only to familiarize the reader with the major findings and results of the three-volume classified report and thus does not reflect the full spectrum of technical matters detailed in the classified report. (Author)

AD-A087 335/6 PC **A06**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Head and Following Wave Exciting Force Experiments on Two SWATH Configurations,
J. A. Fein, and R. Stahl. Jun 80, 122p Rept no. DTNSRDC/SPD-0928-01

The heave force, surge force and pitch moment on a captive model due to regular waves have been obtained for two SWATH configurations. Exciting forces in head seas have been obtained for the SWATH 6D model and the SSP KAIMALINO model, and following-sea excitations have been obtained for the SWATH 6D model. The forces, moments and phase angles are presented for a range of regular wave frequencies. The experiments were conducted with and without propulsion which was found to have no effect on the coefficients. (Author)

AD-A087 343/0 PC **A03**/MF **A01**
Defence Research Establishment Atlantic Dartmouth (Nova Scotia)
Model Scale Effects on a 16-309 Flapped Hydrofoil Section.
Technical memo.,
Eric A. Jones. Apr 80, 46p Rept no. DREA-TM-80/B
Abstract in French.

Wind and water tunnel tests have been conducted of a NACA 16-309 section with the standard a = 1.0 camber line and equipped with a 25% flap-chord ratio, simple, sealed flap. Differences between test results from the two facilities are discussed, as well as the effect of placing roughness strips near the leading edge. Results are given showing the dependency of force, moment and, in particular, cavitation inception on Reynolds number over the range from 1.25 x 10 to the 6th power to 4.0 x 10 to the 6th power. (Author)

AD-A087 418/0 Not available NTIS
National Research Council Washington DC Maritime Transportation Research Board
Alternative Fuels for Martime Use.
Committee rept.
May 80, 204p
Contract N00014-75-C-0711
Availability: Office of Publications, National Academy of Sciences, 2101 Constitution Avenue, N.W. Washington, DC 20418 HC $9.75 (No copies furnished by DTIC).

The objectives of this study were to review the potential fuels that may be available to the marine industry from 1980 to 2000 and to define the economic, technical, environmental, and social impacts of these alternative fuels on marine power plants. From the outset of this study the committee agreed that three basic questions face the maritime industry concerning alternative fuels: (1) What are the likely alternative fuels that may be used by the maritime industry. (2) What has to be done to use these fuels. (3) How will these fuels perform in various types of prime movers. Many groups are currently engaged in similar studies, and in reaching our conclusions we have tried to make maximum use of the information available. We hope this report will assist the industry in making decisions about which power plants to use in new construction and which alternate fuels may be used in current vessels.

AD-A087 436/2 PC **A16**/MF **A01**
Rohr Marine Inc National City CA
Surface Effect Ship Structural Producibility. Part 1.
14 May 80, 368p
Contract N00024-77-C-2032
See also part 2, AD-A087 437.

For the purpose of this report the term 'structural producibility' is the effect of the manufacturing process on the design (i.e., a producible design is one that is within the ability of the manufacturing function to fabricate at a specified quality and cost level). The producibility effort was carried out through an extensive aluminum welding, fabrication and repair technique development program; the fabrication and evaluation of the SES-100A1 bow modification and the construction and assembly of the mini-modules representing two small segments of the 3KSES hull. The SES-100A1 modification provided valuable exposure to actual production problems, including dimensional variance due to previously locked-in stresses as well as tolerance build-up and additional induced warpage from weld shrinkage. The mini-module being a representative of actual 3KSES structural elements with truss joints and typical member splices exposed various assembly and weld joint crack problems which required both design and manufacturing development to resolve. In order to develop an overall optimum structural design for the 3KSES, various assembly sequences, welding techniques and joint types were investigated for accessibility, effectiveness of weld preparation and manufacturing techniques and strengths of the joints produced. The accuracy of alignment and fit-up of the various elements, having a direct effect on final assembly strength, was also evaluated to establish overall fabrication requirements.

AD-A087 437/0 MF **A01**
Rohr Marine Inc National City CA
Surface Effect Ship Structural Producibility. Part 2.
14 May 80, 576p
Contract N00024-77-C-2023
See also Part 3, AD-A087 438.
Availability: Microfiche copies only.

For abstract see AD-A087 036.

AD-A087 438/8 MF **A01**
Rohr Marine Inc National City CA
Surface Effect Ship Structural Producibility. Part 3.
14 May 80, 367p

Contract N00024-77-C-2032
See also Part 1, AD-A087 436.
Availability: Microfiche copies only.

For abstract see AD-A087 436.

AD-A950 007/5 PC **A02**/MF **A01**
Washington Univ Seattle Applied Physics Lab
The Self-Propelled Research Vehicle.
Progress rept. no. 2, 1 Jun-31 Dec 59,
R. G. Van Wagenen, and J. J. O'Rourke. 29 Jan 60, 25p Rept no. APL-UW-TE-60-3
Contract NOrd-12937

No abstract available.

PB80-212210 PC **A05**/MF **A01**
MITRE Corp., McLean, VA.
Concept Development and Simulation Test Plan for an Advanced Capabilities Vessel Traffic System.
Technical rept.,
Joseph J. Fee, William Lascelle, and David Nieri. Feb 80, 77p CAORF-43-7909-02, NMRC-201
Contract MA-5-0058

The prevention of marine accidents, particularly those involving ecologically hazardous materials has become a vital national concern in the past decade. The establishment of Vessel Traffic Services (VTS) by the Federal Government was undertaken to improve the safety of maritime transportation in major U.S. harbors. The existing VTS were developed using state-of-the-art technology and do not require special equipment for the participating ship which must, however, be capable of communicating on the VHF radio channels designated for this purpose. This report discusses deficiencies of current VTS technology and practices in the context of pilot navigational needs and develops a concept for the introduction of an Advanced Vessel Traffic Service (ACVTS) which would utilize a digital link to obtain ship identity and position and provide a common digital data broadcast to all participants which would give each pilot a ship-centered display of traffic in his vicinity. The concept is based upon the internationally adopted digital selective (SELCALL) signaling system for maritime communications and would utilize advanced state-of-the-art portable displays for the pilots involved. The technical feasibility of this concept is illustrated and the major technical trade-offs are developed. A scenario for CAORF simulation is developed to demonstrate the advantages of ACVTS by comparing it with current VTS and existing pilotage procedures in New York Harbor for moderately high levels of traffic.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A087 353/9 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Computation Mathematics/Logistics Dept
Finite Element Analysis of Piping Tees.
Final rept. Oct 79-Jun 80,
Antonio J. Quezon, Gordon C. Everstine, and Michael E. Golden. Jun 80, 49p Rept no. DTNSRDC/CMLD-80/11

Finite element analyses were performed for a 24 in. x 24 in. x 10 in. schedule 40 carbon steel piping tee subjected to five orthogonal forces, six orthogonal moments, and internal pressure. The NASTRAN and CORTES/SA computer programs were used to compute displacements and normalized principal stresses for four finite element models. (CORTES/SA is a special purpose finite element analysis program for tee joints developed at the University of California at Berkeley.) The first three models generated were analyzed by NASTRAN, and the third and fourth models were analyzed by CORTES/SA, resulting in a total of five finite element analyses. Flexibility factors and normalized principal stresses were then compared to experimentally obtained results. One of the four models investigated was generated from actual measured geometry using GPRIME, a geometric and finite element modeling system developed at DTNSRDC. The other three models were generated from an idealized tee using the data generator contained in CORTES/SA. The generation by GPRIME of the finite element model from actual geometry was more difficult and expensive than the generation of CORTES/SA of an idealized model of the tee. In addition, the idealized model proved to be adequate when analyzed by NASTRAN.

13L. Safety Engineering

AD-A086 990/9 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Safety and Health Hazard Evaluation - General Equipment.
Final rept. on test operations procedure.
6 May 80, 22p Rept no. TOP-10-2-508
Supersedes Report dated 22 May 70, AD-872 274.

This TOP describes development test procedures required to determine whether general equipment is free from design, operational or maintenance hazards which could prevent accomplishment of their intended mission. Checklists and a hazard analysis format are provided to assist test personnel in the assessment of hazards. (Author)

AD-A087 093/1 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Comparative Analysis of Fire Protection Systems for Essential Electronic Data Processing Equipment.
Master's thesis,
Robert L. Doerr, and Thomas H. Gross. Jun 80, 121p Rept no. AFIT-LSSR-31-80

This research analyzed the controversy between Halon 1301 and sprinkler systems as to the preferred method of fire protection for essential electronic data processing equipment (EDPE). The existence of such a controversy, backed by the importance of EDP capability to the Air Force, advances in computer technology, and lack of a formal Air Force study in this area suggested that such a study was needed. A comparative analysis methodology was then developed which incorporated eight evaluation criteria representing factors important to the Air Force. The eight criteria were reliability, maintenance, cost, safety, adaptability, catastrophic fire, overseas support, and equipment downtime, Based on an assignment of equal weight to all eight criteria, the comparative analysis revealed that sprinklers were markedly superior to Halon 1301. Therefore, the Air Force should reassess its policy of commitment to Halon 1301 as the primary fire protection system for essential EDPE and take action to avert substandard performance of existing Halon 1301 installations. (Author)

PB80-205750 PC **A05**/MF **A01**
Opinion Research Corp., Princeton, NJ.
I. Safety Belt Usage Among Drivers. II. Use of Child Restraint Devices, Passenger Safety Belts and Position of Passengers in Cars. III. Motorcycle Helmet Usage.
Final rept.,
Benjamin M. Phillips. May 80, 80p 51495, DOT-HS-805 398
Contract DOT-HS-7-01736

NHTSA has sponsored several studies in the past which have been directed to observe and record belt usage by drivers in cars equipped with different warning and hardware systems in 19 cities. The purpose of the current research effort is to continue observing and recording belt usage for a period of 26 months (November 1977-December 1979) in these same 19 cities to determine the effectiveness of various older, as well as newer, safety belt systems in increasing belt usage. Specific objectives of this study are: To continue to monitor safety belt usage rates by drivers in all model year cars (Model years 1964 through 1960); Analyze usage data by: Type of belt system, Age and sex of driver, Model year of car, Region of country, Type of road, Month of year, Car make and model. In addition to observing and recording safety belt usage at primary road intersections and freeway exit sites in the 19 cities, the study was designed to observe safety belt usage: (1) in rural areas; and (2) on three major turnpikes -- Massachusetts, Pennsylvania and Florida for a period of 12 months. The primary purpose of the Turnpike Study was to measure daytime vs. nighttime safety belt usage among drivers.

PB80-206808 PC **A09**/MF **A01**
Urban Inst., Washington, DC.
How Effective Are Your Community Recreation Services,
Donald M. Fisk, Harry P. Hatry, and Kathleen Hudak. Apr 73, 196p HUD-0001524
Contract BOR-1-14-07-7
Sponsored in part by Ford Foundation, New York.

Written for recreation managers and other officials, this report presents a suggested set of measurements and procedures for collecting recreation effectiveness data. The procedures for data collection were developed and tested in Washington, DC, and Rockford, IL. While the data collection procedure calls for using existing data sources whenever possible, a major technique for collecting new data on many of the effectiveness measures is a periodic citizen survey given to citizens in both test cities and was designed to collect information from a representative cross section of a community's population, including both public recreation facility users and nonusers. The survey focuses on citizens' recent experiences and their perceptions of existing recreational opportunities in a sample of households in each neighborhood. Questions concerned the cleanliness and safety of facilities, helpfulness of personnel, condition of equipment, hours of operation, and crowdedness of facilities, as well as other information. Other collection techniques are presented for obtaining data on such measures of effectiveness as physical accessibility and safety. Overall cost and manpower requirements are also considered.

PB80-207566 PC **A02**/MF **A01**
Federal Emergency Mangement Agency, Washington, DC.
Annual Report on Implementation of the Federal Fire Prevention and Control Act of 1974. (Fifth).
Annual rept. for calendar year 1978.
1979, 22p
See also report dated 30 Jun 76, PB-285 035.

The fifth Annual Report details the progress made during 1978 in the following areas; Conquering Arson, Making Homes more Fire Safe, National Fire Incident Reporting System, Assistance to State and Local Governments and Federal Assistance to Firefighters and Fire Officers. The focus of the report is to increase fire information and research at state, local and national levels. The opening of the National Fire Academy at Emmitsburg, Maryland is announced. The Academy is expected to train 300 firefighters a week by mid 1980. Fourteen courses have been field tested to train students in executive development, fire prevention and suppression techniques.

PB80-208226 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL.
Analysis of Fire Dectectors Test Methods/Performance: A Summary Report,
K. R. Mniszewski, T. E. Waterman, S. W. Harpe, and W. J. Christian. Jun 80, 32p IITRI-J6391-S, FEMA/FA-14A
Contract NSF-C-76-19255
Prepared in cooperation with Underwriters' Labs., Inc., Northbrook, IL.See also PB80-208234.

This summary report describes the development of a critique of existing detector testing and offers limited guidance on installation criteria related to test results. Broad ranges of performance were established and compared reflecting the potential for application of each fire detection unit in a variety of environments. The tests were done in four spaces of different configurations. The testing was done to determine detector's effectiveness in terms of life safety. Analysis of the relationship between life safety and property protection clearly indicates that building volume plays a strong role in the life safety aspects of fires. It was found that as the criteria for determining detector effectiveness in terms of safety to life differ from those directed to determining effectiveness in terms of property protection, the testing of detectors for life safety must

also differ. Tests were conducted with flaming and smoldering fires and results have indicated maximum distances or detector placement for all fires in corridors and in large area rooms.

PB80-208234 PC A18/MF A01
IIT Research Inst., Chicago, IL.
Analysis of Fire Dectectors Test Methods/Performance,
K. R. Mniszewski, T. E. Waterman, S. W. Harpe, and W. J. Christian. Jun 80, 419p IITRI-J6391, FEMA/FA-14
Contract NSF-C-76-19255
Prepared in cooperation with Underwriters' Labs., Inc., Northbrook, IL.See also PB80-208226.

This comprehensive report describes the development of existing detector testing and offers limited guidance on installation criteria related to test results. Broad ranges of performance were established and compared reflecting the potential for application of each fire detection unit in a variety of environments. The tests were done in four spaces of different configurations. The testing was done to determine the detectors' effectiveness in terms of life safety. Analysis of the relationship between life safety and property protection clearly indicates that building volume plays a strong role in the life safety aspects of fires. It was found that the criteria for determining detector effectiveness in terms of life safety differ from those directed to determining effectiveness in terms of property protection, the testing of detectors for life safety must also differ. Tests were conducted with flaming and smoldering fires and results have indicated maximum distances or detector placement for all fires in corridors and in large area rooms.

PB80-208846 PC A04/MF A01
Battelle Columbus Labs., OH.
Investigation of Improved Sensor/Actuator Concepts for Residential Fire Sprinkler Systems.
Final rept. Jun-Dec 79,
David C. Doerschuk, and Stan E. Kleszczelski.
31 Jan 80, 73p FEMA/FA-9
Contract FA-79-038

An information search of potential techniques to sense residential fires and activate water sprinklers was made. Several novel approaches to increasing sprinkler sensitivity, reducing spurious action, and reducing cost were selected for laboratory development. Transistor and thermal resistor based electronic fire sensors were built to actuate a solenoid and pyrotechnic valves. A temperature-sensitive, shape-recovery, nickel titanium alloy was used to build a simple, modified, conventional link sprinkler and a sprinkler that automatically turns off after use. Controlled temperature, temperature response, water flow, and hydrostatic leakage testers were built. The hardware was tested and recommendations were made for the development of future systems.

13M. Structural Engineering

AD-A087 230/9 PC A03/MF A01
Forest Products Lab Madison WI
Laminated Beams of Isotropic or Orthotropic Materials Subjected to Temperature Change.
Forest service research paper,
Shun Cheng, and T. Gerhardt. Jun 80, 31p Rept no. FSRP-FPL-375

This paper considers laminated beams with layers of different isotropic or orthotropic materials fastened together by thin adhesives. The stresses that result from subjecting each component layer of the beam to different temperature or moisture stimuli which may also vary along the length of the beam, are calculated. Two-dimensional elasticity theory is used so that a wide range of problems, such as that of beams composed of layers of orthotropic materials like wood, can be studied, and accurate distributions of normal and shear stresses obtained. The stress intensity along the bearing surfaces of the layers of the beam is of particular importance because it is responsible for delamination failures of laminated structural elements. The distributions of interlaminar normal and shear stresses measured along the longitudinal axis of the beam indicate that high stress intensity occurs in the end zones of the beam. Thus, delamination failure, when it occurs, will start at the end of the beam. (Author)

AD-A087 231/7 PC A03/MF A01
Forest Products Lab Madison WI
Survey of Existing Performance Requirements in Codes and Standards for Light-Frame Construction.
Forest service general technical rept.,
G. E. Sherwood. Jan 80, 26p Rept no. FSGTR-FPL-26

Present building codes and standards are a combination of specifications and performance criteria. Where specifications prevail, the introduction of new materials or methods can be a long, cumbersome process. To facilitate the introduction of new technology, performance requirements are becoming more prevalent. In some areas, there is a lack of information on which to base acceptable performance. As background information, existing major codes and standards were surveyed. Existing criteria are listed for each aspect of construction under major headings of structural and environmental. A brief discussion of agreement, differences, and deficiencies is also given. Selected references include publications that should be useful in establishing performance requirements. This information should be useful to building researchers and others concerned with development of performance requirements for buildings. (Author)

AD-A087 301/8 PC A06/MF A01
General Dynamics Corp Fort Worth TX Fort Worth Div
Durability Methods Development. Volume I - Phase I - Summary.
Final technical rept. Apr 78-Jun 79,
S. D. Manning, W. R. Garver, S. P. Henslee, J. W. Norris, and B. J. Pendley. Sep 79, 113p FZM-657-VOL-1, AFFDL-TR-79-3118-VOL-1
Contract F33615-77-C-3123

A summary is presented of an analytical methodology developed to meet USAF durability requirements. Details are given in four companion volumes. Analytical approaches that are currently used or have potential to be used to determine economic life are surveyed. Results of a structural survey of durability problems experienced at USAF ALC's are summarized. Durability critical parts criteria and economic life criteria are discussed. An analytical method to determine the crack population in a structure as a function of service time is presented. Fastener-hole cracking is the basic form of damage analyzed. Representations of initial quality and growth of small cracks are discussed. The effect of inspection and repair on the distribution of cracks is included. (Author)

AD-A087 336/4 PC A04/MF A01
Boeing Military Airplane Co Seattle WA
Cast Aluminum Structures Technology (CAST) Structural Test and Evaluation (Phase V). Part II. Fatigue and Fracture Properties of Cast Aluminum Bulkheads.
Final rept. Feb 77-Jan 80,
Christian K. Gunther. Apr 80, 72p D180-25724-2, AFWAL-TR-80-3021-PT-2
Contract F33615-76-C-3111
See also Part 3, AD-A087 337 and Phase 4, AD-A078 854.

The fatigue and fracture properties of four cast A357-T6 aluminum alloy bulkheads were investigated. Constant amplitude fatigue, crack growth, and fracture-toughness specimens were excised from the bulkheads for this purpose. The data obtained from these specimens confirmed the assumed properties used in the durability and damage tolerance analyses of the bulkhead.

AD-A087 337/2 PC A07/MF A01
Boeing Military Airplane Co Seattle WA
Cast Aluminum Structures Technology (CAST) Structural Test and Evaluation (Phase V). Part III-Static Property Allowables.
Final rept. Jun 76-Aug 79,
Dale L. McLellan. Apr 80, 141p D180-25724-3, AFWAL-TR-80-3021-PT-3
Contract F33615-76-C-3111
See also Part 2, AD-A087 336 and Phase 4, AD-A078 854.

This document contains static mechanical properties of A257-T6 aluminum alloy castings. Properties of castings are relatable to non-destructively measured soundness and aluminum dendrite size. A criterion is developed for design properties in terms of these physical parameters applicable to all castings of the same alloy and temper regardless of size, shape, method of production, mold materials or other process variables. (Author)

PB80-207269 PC A03/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Approach to Improved Durability Tests for Building Materials and Components.
Final rept.,
Geoffrey Frohnsdorff, Larry W. Masters, and Jonathan W. Martin. Jul 80, 39p NBS-TN-1120

Durability tests usually provide relative measures of the time building materials and components will perform their intended functions under the expected service conditions. This is not adequate to ensure the proper selection of new building materials and components because quantitative measures of long-term performance are needed. Although many tests have been developed to accelerate degradation processes of building materials, they are seldom fully adequate for reliably predicting long-term performance. In this paper, a recommended practice, ASTM E 632-78, which provided a framework for the development of improved durability tests, is outlined. The application of the recommended practice, which does not specify an analysis procedure, is illustrated by examples from the literature using both deterministic and probabilistic approaches. While probabilistic concepts have not been applied extensively to materials durability problems in the construction industry, these concepts offer new opportunities for obtaining improved quantitative predictions of the service life of building materials.

14.

METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A086 890/1 PC A02/MF A01
Stanford Univ CA Edward L Ginzton Lab
Computer-Controlled System for Measuring Two-Dimensional Acoustic Velocity Fields.
D. B. Ilic, G. S. Kino, A. R. Selfridge, and F. E. Stanke. 1979, 5p GL-3032, AFOSR-TR-80-0524
Grants AFOSR-78-3726, NSF-DMK76-00726
Pub. in Ultrasonics Symposium Proceedings, p269-272 Sep 79.

No abstract available.

AD-A086 951/1 PC A04/MF A01
Life Systems Inc Cleveland OH
Evaluation of Electrochemical Organic Content Analyzer for Army Water Supply Technology.
Final rept. 1 May 79-30 Apr 80,
R. J. Davenport, and J. B. Lantz. Apr 80, 63p Rept no. LSI-TR-391-4
Contract DAMD17-79-C-9058

Army-related applications for the EOC Analyzer have been surveyed. Applications in which the EOC Analyzer may be used effectively are (1)

monitoring activated carbon and synthetic adsorbent columns used for removal of organic contaminants from munitions wastes, metal finishing wastes and other wastewaters treated in physical-chemical treatment systems, (2) monitoring adsorption, coagulation or sedimentation processes for removal of the precursors of trihalomethane formation in drinking water, (3) monitoring and controlling biological wastewater treatment for process optimization and (4) monitoring oil and grease removal systems. The EOC Analyzer was tested for possible use as a monitor of polyelectrolyte addition in the Reverse Osmosis Water Purification Unit developed by the U. S. Army Mobility Equipment Research and Development Command. The Analyzer was too sensitive to the organics in the water to be successfully used in that application, but an on-line turbidimeter, tested in parallel, provided the necessary response characteristics. (Author)

AD-A087 047/7 PC **A02**/MF **A01**
Eastman Kodak Co Rochester NY
Optical Power Spectrum Analyzer. Scanning Laser Beam System Permits Full Format Coverage.
Final rept.,
S. C. Arnold, and D. J. Josephson. 17 Dec 79, 23p ETL-0214
Contract DACA76-78-C-0003

On 18 April 1978, Eastman Kodak Company was awarded a contract to design, fabricate, test, deliver and install an Optical Power Spectrum Analyzer (OPSA). The contract defines a design and fabrication effort intended to draw upon developed technology for its operating principles. This final report therefore deals with the results of final acceptance testing and how the final performance test data compares with initial design requirements. (Author)

AD-A087 059/2 PC **A12**/MF **A01**
Grumman Aerospace Corp Bethpage NY
Design Guidelines and Optimization Procedures for Test Subsystem Design.
Final rept. May 78-May 79,
Donald N. Lord, George A. Walz, and Stan Green. Apr 80, 263p RADC-TR-80-111
Contract F30602-78-C-0167

This study provides guidelines and procedures to optimize the design of built-in-test equipment. The procedures are applicable to the design of both avionic and ground electronic systems. Optimization of the test subsystem is achieved by properly specifying three key design parameters (test effectiveness, mean corrective maintenance time, and test subsystem production costs) during the Conceptual Phase. These parameters then form the 'design to' criteria for optimization during the System, Subsystem, and Detail Design Phases. The report provides straightforward mathematical tools, algorithms, and trade-off procedures to assist the designer during each design phase. (Author)

AD-A087 077/4 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Tropic Exposure Testing.
Final rept. on test operations procedure.
1 May 80, 21p Rept no. TOP-1-2-616

This TOP describes general procedures for atmospheric exposure of metals, natural and synthetic polymers, and other materials in a tropic environment. (Author)

AD-A087 124/4 PC **A03**/MF **A01**
Martin Marietta Aerospace Orlando FL Microelectronics Lab
Computer Aided Automated Hybrid Substrate Probe Testing Development.
Final rept. Oct 78-Mar 80,
Connie D. Gill, and Robert E. Sulouff. 31 Mar 80, 39p Rept no. OR-15908
Contract DAAK40-78-C-0299

The use of an electron beam for the contactless probing of hybrid substrates is discussed. The injection of an electrical charge using the electron beam results in a surface field which enhances the generation of secondary electrons which a second electron probe is directed at a substrate probe position. The discussion of the theoretical basis and experimental findings are correlated. The results of this study indicate that a new method of substrate probing exists. However, careful interpretation of the results must be performed. The applicability to multilayer thick film substrates suggest future adaptation as an in-line manufacturing or test technique. (Author)

AD-A087 217/6 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Development and Operation of 8 Inch Laboratory ESR Furnace at Watervliet Arsenal.
Technical rept.,
W. Sullivan, and V. Colangelo. Mar 80, 37p
ARLCB-TR-80007, AD-E440 072

This report is an evaluation of a contractor furnace (ESR) for use in laboratory experiments in melting solid and hollow ingots. The report describes the condition of the furnace as installed, the problems encountered together with the design changes made in-house to correct the existing deficiencies. The report also indicates the technical areas that must be explored to fully develop a hollow ingot technology.

AD-A087 219/2 PC **A06**/MF **A01**
Army Missile Command Redstone Arsenal AL High Energy Laser Center
Mid-Term Progress Report on the Development of Army Closed Cycle Circulator (CCC) System.
Technical rept.,
Myron W. Cole, and Cornelius C. Shih. 20 Sep 79, 111p DRCPM-HEL-79-5, AD-E950 001

A Closed Cycle Circulator System was developed for recirculating the laser gas through the cavity in order that problems of acoustic attenuation, thermal control, gas contamination, and power gain may be investigated for various pulsed energy inputs at the cavity. The circulator was assembled and tested for its performance evaluation. Its instrumentation subsystem was developed and calibrated to a reasonable accuracy. For safety, standard operating procedures have been established for review and approval. The instruments calibrated include hot wire anemometers for velocity and temperature, piezoelectric transducers for pressure, flow meter for mass flow rate, and interferometer for medium homogeneity. A series of trial tests of the Closed Cycle Circulator System resulted in an experimental analysis of performance data providing a better control of flow conditions in the cavity through the control mechanism. (Author)

AD-A087 291/1 PC **A02**/MF **A01**
Cober Electronics Inc Stamford CT
High Voltage Nanosecond Pulse Generator.
Interim technical rept. no. 5, 1 May-31 Oct 79,
C. Zavales. Jul 80, 19p DELET-TR-77-2641-5
Contract DAAB07-77-C-2641

A parallel Blumlein circuit, combined with a spark gap switch, was designed for operation at 24 kV, 5,000 A peak. Tests were conducted with a single Blumlein with a 10 ohm load. Because of problems with breakdown in the triggered spark gap, a slightly larger spark gap was substituted. An acceptable pulse is delivered from the pulse forming network after adjustment of the inductive elements in the network. (Author)

14E. Reprography

AD-A087 285/3 MF **A01**
Texas Tech Univ Lubbock Optical Systems Lab
Space-Variant Processing Using Phase Codes and Fourier-Plane Sampling Techniques,
Rangachar Kasturi. 1 Jun 80, 158p SCIENTIFIC-1, AFOSR-TR-80-0557
Grant AFOSR-79-0076
Report on Space Variant Optical Systems.
Availability: Microfiche copies only.

This report discusses alternative approaches to using multiplex holography representing space-variant optical systems. The first part of the report presents the results of extensive computer simulations used in evaluating the effectiveness of Gold codes in encoding the multiple reference beams required in a sampled input/multiple reference beam realization of a space-variant system. The second part considers a totally different approach which samples the input plane and the transfer function plane. This latter approach eliminates crosstalk entirely, but requires multiple copies of the sampled input function during the playback step. The results of preliminary experiments conducted to evaluate this alternative approach for representing space-variant systems holographically are presented, including experiments verifying the coherent addition of the multiplexed holograms on playback using computer-multiplexed holograms. (Author)

PATENT-4 191 461 Not available NTIS
Department of the Navy Washington DC
Camera Jig for Underwater Stereoscopic Photography.
Patent,
John Mittleman, Charles O. Warrell, and Ronald S. Peterson. Filed 16 May 79, patented 4 Mar 80, 6p AD-D007 385/8, PAT-APPL-6-039 990
Supersedes PAT-APPL-6-039 990, AD-D007 055.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A portable camera jig for use by divers in making closeup, stereoscopic photographs of underwater surfaces with a single lens camera includes, in combination with a sheet metal frame, a clear water box for operation in turbid water and that will permit illumination and operator viewing of the surface to be photographed, a camera support and parallogram linkage for moving the camera laterally between successive exposures, a light source mounted on a mast, and handles by which an individual diver can position the jig and shift the camera. (Author)

15. MILITARY SCIENCES

15A. Antisubmarine Warfare

PATENT-4 200 859 Not available NTIS
Department of the Navy Washington DC
Device for Simulating Marine Craft Noises.
Patent,
David J. Evans, and Clark F. Bradley. Filed 21 Apr 46, patented 29 Apr 80, 11p AD-D007 405/4, PAT-APPL-656 104
Supersedes PAT-APPL-656 104-46.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In combination in electronic apparatus for simulating the self-noise of a submarine, means for generating a wide-band noise signal, means for modulating the noise signal at a frequency corresponding to the propeller speed of a submarine, means for generating a signal at the frequency of the tooth impacts of the main drive gear of a submarine, and amplifying and output means for both said tones. (Author)

PATENT-4 200 920 Not available NTIS
Department of the Navy Washington DC
Artificial Underwater Target.
Patent,

David J. Evans, and Clark F. Bradley. Filed 29 Feb 56, patented 29 Apr 80, 6p AD-D007 404/7, PAT-APPL-573 577
Supersedes PAT-APPL-573 577-56.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In combination in a free, underwater craft, a hull, means for carrying ballast, means for discharging said ballast, depth responsive means, a timer providing two time intervals, control means operated by said timer for actuating said discharging means after a pre-set time interval, and other control means operated by both said timer and said depth responsive means for actuating said discharge means after a shorter time interval if said craft attains a pre-set depth. (Author)

15B. Chemical, Biological, and Radiological Warfare

AD-A087 268/9 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Effects of TAB on Near Visual Acuity in Monkeys: A Pilot Study.
Interim rept. Sep-Oct 78,
C. Thomas Bennett, Grant D. Callin, Donald N. Farrer, Charles Link, and Richard R. Deyak, Jr. Mar 80, 10p Rept no. SAM-TR-80-4

Two rhesus monkeys were trained to discriminate right- and left-opening Landolt 'C' rings, requiring visual acuity ranging from 20/200 to 20/30. Following an injection of TABx1 equivalent to the dose in a single Combopen, mild decrements in near visual acuity were observed. A similar, but more persisting (1.5 hr) decrease in acuity occurred following the TABx3 dose. The highest dose of the antidote injected (TABx10) produced a dramatic degradation, persisting more than 2, but less than 24, hours. (Author)

15C. Defense

AD-A087 115/2 PC **A06**/MF **A01**
Pattern Analysis and Recognition Corp Rome NY
Fence Detection System.
Final technical rept.,
John P. Yermas, William C. Fullin, and Michael B. Koligman. Dec 79, 118p Rept no. PAR-79-93
Contract DAAK70-79-C-0049

This report culminates the efforts for the development of a fence detection system using the Magnetic Integrated Line (MILES) or Enclosed Wire-in-Tube (EWIT) Transducers. The effort consisted of collecting analog data from transducer samples mounted to a chain link fence at Rome Air Development Center Site 2D, Rome, NY and analyzing this data, in addition to MERADCOM furnished data, for the purpose of developing a computer model of a signal processor for intrusion detection. Design goals for the processor included a probability of detection of at least 90% and a nuisance alarm rate of less than 1 in 48 hours under a variety of manmade and environmental disturbances. Detection criteria included fence climbovers with the assistance of a ladder, intruder climbing to the top and jumping off, fence climbovers using carpeting as protection against the barbed tape and cutting the fence. Nuisance alarm rejection is based on input stimuli to include thunder and lightning within a 5 mile radius, wind speeds to 36 mph, power line induced signals and large vehicles greater than 20 meters away.

AD-A087 119/4 PC **A02**/MF **A01**
Stanford Univ CA Computer Systems Lab
Distributed Data Processing for BMD.
Final rept. 1 Apr 79-30 Mar 80,
Michael J. Flynn. Apr 80, 21p
Contract DASG60-77-C-0073

Language oriented architecture provides an interesting approach to enhancing the performance of particular problem environments. Special language-oriented architectures called Directly Executed Languages (DELs) have been developed which are designed to provide very efficient program representations for particular languages and for particular classes of problems. In this report, section 1 is an introduction to these language oriented architectures and the second section is a review of some more recent work on Directly Executed Languages as they relate to BMD architecture development. Section 3 develops an introduction to a theory of language oriented operating systems to support the DEL concept.

AD-A087 130/1 PC **A05**/MF **A01**
Human Sciences Research Inc McLean VA
Reception and Care Planning for Widely Dispersed Populations.
Final rept. Apr 78-Mar 80,
Cecil H. Davis, and William W. Chenault. Mar 80, 89p Rept no. HSR-RR-80/8-ME-X
Contract DCPA01-78-C-0193

The report examines the numerous factors affecting the capacity of communities to absorb and care for evacuees, and illustrates the impact of a greater dispersal of the evacuee population on preparedness activities related to the reception and care of evacuees. The report concludes that the existing civil defense Reception/Care guidance is fully adaptable to the requirements of a more dispersed evacuee population; on the other hand, a widespread dispersal would preclude using much of the host area's infrastructure, and would require the mandatory billeting of evacuees in private homes. (Author)

AD-A087 185/5 PC **A08**/MF **A01**
Army Military Personnel Center Alexandria VA
An Illustrative Case Study for Twentieth Century Defense Planners: The Technology and Politics of United States Coastal Defense, 1880-1898.
Final rept.,
Kenneth Earl Hamburger. 24 Apr 80, 172p
Master's thesis.

Three critical groups of individuals determine what U.S. defenses will be at any time: 'publicists' recommend defensive measures; 'planners' translate recommendations into legislative proposals; 'politicians' decide which proposals will be funded. National welfare is the rational basis for providing defenses, yet proposals more often fail because of narrower parochial considerations. U.S. coastal defenses during the transition from the tecnologies of cast-iron guns and wooden ships to steel guns and armored ships (approximately 1870-1900) provide a case history of providing for U.S. defense, with twentieth century parallels. Publicists and planners quickly recognized the technological obsolescene of pre-Civil War coastal defenses, yet politicians failed to provide funds for improved defenses except when pushed by the threat of war; ultimately, only the coastal vulnerability demonstrated by the Spanish-American War (1898) provided an impetus adequate to cause Congress to fund prudent defenses. Reasons for Congressional lethargy are diverse and complex, but include regional interests, isolationism, party politics, inadequate revenues, competing technological proposals, lack of palpable threat, and poorly organized lobbying.

AD-A087 198/8 MF **A01**
General Research Corp McLean VA Operations Analysis Group
Army Combat Capabilities Analysis COMCAP 85.
Final rept.,
J. B. Campbell, L. J. Dondero, and R. E. Forrester. Jun 79, 137p Rept no. GRC-1051-01-79-CR
Contract DAAG39-78-C-0053
Availability: Microfiche copies only.

This report is an analysis of the combat value of US and USSR ground combat weapons projected for 1985. The method of analysis was the use of the GRC COMCAP II methodology of 1974 to update killer-victim scoreboards and generate new WEV values. (Author)

AD-A087 393/5 PC **A03**/MF **A01**
Neurocommunication Research Labs Inc Danbury CT
Neurophysiological Procedures for the Detection of Explosives.
Final rept.,
Sidney Weinstein, Curt Weinstein, and Ronald Drozdenko. Mar 80, 31p
Contract DAAG53-76-C-0020

The aim of this project was to determine the feasibility of employing the rat as a biodetector for TNT. Studies were undertaken at NeuroCommunication Research Laboratories which explored the use of voluntary (operant) and involuntary (classical) conditioning techniques. The emphasis of this project was on the conditioning of an involuntary response: brain wave activity. Once it was established that the rat could be utilized as a biodetector, steps were taken to find those classical conditioning and recording parameters which would maximize detection capabilities. The final portions of this report include technical data which may prove to be useful to the researcher or applied scientist. This report deals both with the general principles in the development of biodetectors and also with the specific, technical data collected in the studies. The first part of this report was written for the reader with no technical background in psychology, physiology, or electrical engineering. Although this project was specifically directed toward the development of a biodetector for TNT, a similar biodetection system could be developed for any substance which produces sensory cues. The techniques described here have also been used successfully in the development of biodetectors for water contaminants.

15D. Intelligence

AD-A086 987/5 PC **A17**/MF **A01**
Pattern Analysis and Recognition Corp Rome NY
Aggregating and Communicating Uncertainty.
Final technical rept.,
John M. Morris, and Raymond J. D'Amore. Apr 80, 385p PAR-79-1, RADC-TR-80-113
Contract F30602-78-C-0291

Strategic intelligence products contain a substantial element of uncertainty which must be communicated to the consumer if they are to be used effectively. As a social science, estimative intelligence uses methods which are largely global or intuitive in nature. Subjective probability assessments may be produced forthese methods, combined, tested for consistency, and communicated to the consumer using techniques described in this report. Two computer-based demonstration systems, the Calibration Assessment Package (CAP) and Subjective Probability Assessments (SPA), are described. General descriptions of several additional systems for data base management and probability assessment are also included.

15E. Logistics

AD-A087 013/9 PC **A04**/MF **A01**
Industrial Coll of the Armed Forces Washington DC
Fielding Army Weapon Systems: Experiences and Lessons Learned.
Research rept.,
James B. Lincoln. Jun 80, 69p

During the 1970s, the Army fielded few new weapon systems, as many development programs were stretched out because of the lack of funds to support production and fielding. The resulting 'bow wave' of new systems scheduled for fielding in the next few years presents a major challenge to the Army. Recently fielded systems present valuable lessons learned that can assist the Army in preparing for the multiple fieldings scheduled for the next five years. Systems that provide lessons learned include: M551 Sheridan; M60A2 and A3 Tank; Vulcan/Chaparral System; M198 Howitzer; Improved TOW Vehicle, M901; TACFIRE; Black

Hawk Helicopter; AH-1S Cobra Helicopter; and TSQ-73 Missile Minder. Lessons learned were categorized into the following areas: Selected ILS activities, New materiel release requirement, Operational testing, TRADOC System Managers, Impact of fielding on the command/unit, and Contractor maintenance support. Ccnclusions and recommendations include a suggestion that Department of Army develop a fielding policy by expanding the current effort to prepare a revised Army regulation on Integrated Logistics Support. (Author)

AD-A087 021/2 PC **A04**/MF **A01**
Operational Research and Analysis Establishment Ottawa (Ontario)
METRIC 2: The Mathematical Theory of a Sparing Model for Repairables,
P. A. Vincent. Mar 80, 60p Rept no. ORAE-M102 Abstract in French.

This report describes METRIC 2, a mathematical sparing model for repairables. After discussing its general structure, the probability and optimization techniques are explored. Finally the sequence of steps required to solve a given problem is discussed. These are basically the steps used in the FORTRAN program of the model currently used in initial provisioning for capital equipment in accordance with the procedures of CF Logistics Management Instruction 1630. (Author)

AD-A087 044/4 PC **A02**/MF **A01**
Assistant Secretary of Defense (Manpower Reserve Affairs and Logistics) Washington DC
An Evaluation Report of Mobilization and Deployment Capability Based on Exercises NIFTY NUGGET-78 and REX-78.
Final rept.
30 Jun 80, 25p

Current national military strategy relies on our ability to assemble and deploy military conventional forces. DOD and the forerunners of the Federal Emergency Management Agency (FEMA) tested our mobilization capability in the fall of 1978 in a series of mobilization exercises. Post-exercise classified evaluations reports were prepared; the need for a brief and clear unclassified report became evident several months after the exercise. This unclassified report is based on several classified assessments prepared by OSD, OJCS, the Services and other Federal Agencies. This report describes the exercises, their objectives, and how they were evaluated. It then assesses the ability of the Federal Government to plan for an execute a large-scale mobilization and deployment of conventional forces. The report also describes actions underway to correct or mitigate problems. This report is as comprehensive as the classified reports upon which it is based; only the classified details are lacking. (Author)

AD-A087 088/1 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Study of Fuel Supplies for Emergency Power Generation at Air Logistics Centers.
Master's thesis,
Stephen J. Mott, and Sherman D. Nelson. Jun 80, 174p Rept no. AFIT-LSSR-17-80

The uncertainty of the availability of future supplies of petroleum has raised the possibility that a future electrical power curtailment could be accompanied by a simultaneous curtailment of petroleum fuel supplies. During such curtailments the ability of the Air Force Logistics Command's Air Logistics Centers to accomplish the essential operations required by a wartime scenario may depend upon the use of emergency back-up generators to provide electrical power to critical facilities. After obtaining information about the back-up generators at each Air Logistics Center and the quantities of fuel likely to be available for generator use during a supply curtailment, a linear programming computer package is used to determine the maximum length of time each Air Logistics Center can continue to meet its minimum critical operating requirements during a complete curtailment of commercially supplied electrical power and petroleum fuels. After reviewing the results of the computer analyses, the authors conclude that a long-term curtailment may have significant adverse impact on the ability of the Air Logistics Centers to meet critical operating requirements during a war-time scenario. (Author)

AD-A087 094/9 PC **A10**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Analysis of the Future Requirements for Materials Handling Equipment in the Military Airlift Command.
Master's thesis,
Christopher Carson, and Charles D. Munson. Jun 80, 207p Rept no. AFIT-LSSR-35-80

Civilian wide-bodied aircraft are presently used to augment the Military Airlift Command's airlift capability. Many analysts believe that this wide-body usage will increase in the future. However, even today, the basic 463L materials handling equipment system (e.g., K-loaders) cannot accommodate civilian wide-bodies. Cargo loader adapters and modifications have proven infeasible, necessitating the use of elevators for loading/unloading operations. Therefore, the purpose of this study was to examine whether the United States Air Force should continue to write specifications around the present K-loaders, or initiate acquisition of a cargo loader capable of interfacing with both military aircraft and civilian wide-bodied aircraft. The examination of these two decision alternatives involved three main phases: (1) a forecast of the future U.S. wide-body and narrow-body market, (2) a determination of Military Airlift Command's future loader requirements based on predicted changes in cargo activity, and (3) a net present value analysis of system costs built on various policies for loader replacement. After the results of these phases were obtained, the authors concluded that the Air Force should continue to acquire, operate, and maintain its present K-loader system. (Author)

AD-A087 220/0 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
The Relationship of Source Selection Sensitive Data to Competition and Negotiations,
Master's thesis,
Linda K. Allen, and Michael J. Hubert. Jun 80, 111p Rept no. AFIT-LSSR-3-80

The objective of this research was to determine whether relationships exist between government ownership of source selection sensitive data and the level of competition, the time/cost of the negotiation effort, and the level of incentives/protection. Currently, there is no evidence to indicate the effect of any such relationships on the acquisition of technical data. Interviews conducted with Contracting Officers and contractor representatives revealed that the acquisition of source selection sensitive data can be impacted by the use of a descision model. The model, in the form of a contract clause, designed to protect technical data acquired with unlimited rights prior to formal source selection resulted in a contractor perception of increased willingness to share proprietary data with the government. (Author)

AD-A087 221/8 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Some Civil Engineering and Management Aspects of Conversion from JP-4 to JP-8 Fuel by the United States Air Force in the Continental United States.
Master's thesis,
Steven M. Pittman, and J. Parke K. Smith. Jun 80, 96p Rept no. AFIT-LSSR-5-80

The purpose of this thesis is to examine the possible conversion in the CONUS from JP-4 turbine fuel to JP-8. While many studies have been conducted to analyze the effects of the conversion on aircraft and support systems there has been little work done to analyze the effects on the facilities in which the fuel is stored and transported. This thesis examines the effects of conversion on the fuel bulk storage tanks and on the piping and pumping system used to transport the fuel. Where appropriate, recommendations have been made concerning the modifications necessary to these facilities to counter any detrimental effects associated with the conversion. (Author)

AD-A087 223/4 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Study to Determine the Role of Competition in Contracting for the Movement of Air Freight within the Domestic Market.
Master's thesis,
John R. Forster, Roland A. Hassebrock, and Mahboob A. Khan. Jun 80, 162p Rept no. AFIT-LSSR-9-80

As a result of the Airline Deregulation Act of 1978, the Civil Aeronautics Board (CAB), ceased setting rates which it had previously done under part 288 of its Economic Regulation. This forced the Military Airlift Command (MAC) to develop a new pricing method that would allow competition to determine price in the awarding of contracts for military air freight service. This study delimited the scope of the problem to only domestic military air freight service. The basis of this study was to determine a contracting method which could be used by MAC and satisfy the three objectives of: maintaining a flexible and sufficient Civil Reserve Air Fleet (CRAF), providing efficient peacetime domestic military air freight service, and permitting competitive market forces to determine price. The researchers' recommended method is that MAC should set rates using procedures previously employed by CAB. The contract should be a fixed price type with provisions for escalation tied to rising fuel costs. The solicitation procedure as now used should be continued with USC 2304 (a) (16) cited as the exception for not using formal advertising. The study additionally presents possible areas of further study which might lead to alternative methods of acquiring these services. (Author)

AD-A087 263/0 PC **A02**/MF **A01**
Army Inventory Research Office Philadelphia PA
Maximum Release Quantity Edits under Mobilization.
Final rept.,
Arthur Hutchison. Jan 80, 17p Rept no. IRO-272

A mathematical model is used within CCSS to detect and reject large and possibly erroneous quantities requisitioned by the retail level. The effectiveness and impact of this model on requisitions generated during a mobilization was questioned. Data from the MOBEX-78 exercise was applied against the current and other edit models to detemine the reject rates. Results indicate fewer rejects would occur in a mobilization environment than in peace. (Author)

AD-A087 349/7 MF **A01**
Arinc Research Corp Annapolis MD
TMDE Modernization Program. Volume 1,
A. Simmons, R. Kavanaugh, and B. Paiz. Jun 80, 274p Rept no. 1576-01-1-2228-VOL-1
Contract DAAB07-78-A-6606
See also Volume 2, AD-A087 350.
Availability: Microfiche copies only.

ARINC Research Corporation conducted a review and analysis of various aspects of the TMDE Modernization Program (TMP) to determine the minimum number of separate makes and models that will replace existing general purpose TMDE in the Army. In addition, a Time-Phased Plan (TPP) for the introduction of TMDE acquired as a result of the TMP was developed, and the effects of not delivering modernized TMDE on schedule were identified. (Author)

AD-A087 350/5 MF **A01**
Arinc Research Corp Annapolis MD
TMDE Modernization Program. Volume II. Appendix E,
A. Simmons, R. Kavanaugh, and B. Paiz. Jun 80, 302p Rept no. 1576-01-1-2228-VOL-2
Contract DAAB07-78-A-6606
See also Volume 1, AD-A087 349.
Availability: Microfiche copies only.

In this appendix the technical characteristics of each LR and its companion OTS ETE specification are displayed by specific parameter. This arrangement facilitates determination of compatibility between the LR and the specification. The data are in OTS ETE specification number sequence. (Author)

AD-A087 411/5 PC **A05**/MF **A01**
Defense Communications Agency Arlington VA MILSATCOM Systems Office

Lease versus Buy Considerations for MILSATCOM Systems and an Acquisition Strategy for STRATSAT (SSS Lease/Buy Study).
Final rept.,
Leonard G. Larson, and Ralph L. Spaulding. Apr 80, 99p DCA/MSO-TR-80-1, AD-E100 349

This report examines the lease/buy question as it applies to MILSATCOM systems to illuminate the issues involved and identify the factors that tend to drive a decision toward one or the other acquisition method. The report is organized into five sections: (1) Lease vs. Buy Considerations for MILSATCOM Systems--a tutorial on the various aspects pertaining to lease vs. buy considerations, (2) Acquisition strategy for STRATSAT--discussion of four possible acquisition strategies to acquire STRATSAT, (3) Comparative Cost Analysis of STRATSAT Lease vs. Buy Options--discussion of methodology and results of the lease vs. buy cost comparisons, (4) Contractor Responses to Leasing STRATSAT--review of contractor positions and views related to the practicality and feasibility of leasing STRATSAT, and (5) Appendixes--description of leasing arrangements for GAPFILLER, LEASAT, and TDRSS. (Author)

PB80-205537 CP **T99**
Defense Logistics Services Center, Battle Creek, MI.
Master Cross Reference List, Part 1.
Data file,
Burdette Pederson, and Trudy Sievking. Oct 80, mag tape DSA/DF-80/013
Supersedes Rept. no. DSA/DF-80/008, PB80-173826.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

Part 1 of the Master Cross Reference List is a Master List of Logistics Reference Numbers cross-referenced to their applicable National Stock Number(s) in the Federal Catalog System. It contains nine basic elements of data: (1) Logistics Reference Number, assigned by the manufacturers; (2) Manufacturers Code identifying the manufacturer; (3) Reference Number Variation Code, indicating whether the reference number is item identifying or requires additional data to correctly identify the item of supply; (4) National Stock Number/Permanent System Control Number; (5) Reference Number Category Code, that designates the relationship of a reference number to an item of supply; (6) Item Standardization Code indicates if the item is authorized or not for procurement; (7) Service Agency Designator Code, delineates the S/A that accepted a National Stock Number that was offered as a substitute for an item; (8) Description Availability, will indicate whether or not the item has a description in the DISC Master File; (9) Item Name is the approved name given to this item.

15F. Nuclear Warfare

AD-A087 121/0 PC **A04**/MF **A01**
Command and Control Technical Center Washington DC
The CCTC Quick-Reacting General War Gaming System (QUICK), User's Manual. Volume IV. Sortie Generation Subsystem. Change 2.
30 Apr 80, 55p Rept no. CCTC-CSM-UM-9-77-vol-4-chg-2
Change 2 to report dated 15 Apr 78, AD-A057 232.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, provide output summaries, and produce input tapes to simulator subsystems external to QUICK. QUICK has been programmed in FORTRAN for use on the CCTC HIS 6000 computer system. The QUICK Users Manual consists of four volumes: Volume I, Data Management Subsystem; Volume II, Weapon/Target Identification Subsystem; Volume III, Weapon Allocation Subsystem; Volume IV, Sortie Generation Subsystem. The Users Manual complements the other QUICK Computer System Manuals to facilitate application of the war gaming system. This volume, Volume IV, provides detailed instructions for execution of the Sortie Generation subsystem and the modules it comprises.

AD-A087 409/9 PC **A03**/MF **A01**
Command and Control Technical Center Washington DC
The CCTC Quick-Reacting General War Gaming System (QUICK). General Description. Change 1.
Technical memo.,
Dale J. Sanders, Paul F. M. Maykrantz, and Jim M. Herrin. 1 Jun 77, 42p CCTC-TM-153-77-CH-1, AD-E100 372
Change 1 to report dated 1 Jun 77, AD-A045 422.

This document is a nontechnical description of the computerized Quick-Reacting General War Gaming System (QUICK). It includes a broad description of system operation, input data requirements, available outputs, and typical applications. QUICK is a tool for examining various facets of possible general wars under a variety of conditions of force posture, strategies, and starting conditions. Based upon suitable input data, QUICK will automatically generate global strategic nuclear war plans, provide statistical output summaries, and supply inputs to external simulators. The QUICK system uses an integrated data base and has been programmed in FORTRAN for use on the CTC HIS 6000 computer system. QUICK is structured to provide non-programmer users a direct interactive capability for a wide range of war gaming applications.

SAND-80-0248 PC **A04**/MF **A01**
Naval Training Equipment Center, Orlando, FL.
Comparison of Experimental and Computational Results for Reverse Ballistic Tests into Foundry Core.
P. Yarrington, F. R. Norwood, and D. E. Grady. Mar 80, 55p
Contract AC04-76DP00789

A series of nine laboratory-scale penetration tests was conducted in which impact velocity and geometry of the projectile were varied. In all tests, displacement histories were obtained for the penetrator via displacement interferometric techniques. From the data, accelerations were deduced and compared with numerically-calculated accelerations. For the numerical work, the codes PENAP and WONDY were used to model the penetration events. For penetrators with a conical nose, agreement between calculated and measured accelerations could be brought within 15% for all tests, except for one PENAP/test comparison, by introducing a constant coefficient of Coulomb friction of 0.1 at the penetration target interface. For penetrators with an ogival nose, on the other hand, a greater discrepancy was found between calculated and measured results. (ERA citation 05:026290)

15G. Operations, Strategy, and Tactics

AD-A087 362/0 PC **A06**/MF **A01**
Army Combined Arms Studies and Analysis Activity Fort Leavenworth KS
Relative Airlift Projection - Infantry Divisions (RAPID Model).
Technical paper,
Jeffrey A. Paulus. Apr 80, 120p Rept no. CASAA-TP-1-80

This paper describes the methodology, data base, and use of the family of programs whose purpose is to generate a projected aircraft sortie requirement for lifting the weapons, vehicles, and other rolling equipment of division-sized forces. The model was designed to support the screening exercise for the Combined Arms Combat Development Activity's Study, Light Division 86, in which many proposals were generated for forming a new division with greater firepower and deployability than current light divisions. (Author)

16.
MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A087 072/5 PC **A05**/MF **A01**
Range Commanders Council White Sands Missile Range NM Documentation Group
Universal Documentation System Handbook. Volume 1. System Description, Program Introduction and Statement of Capability.
Final rept.
Nov 79, 88p Rept no. DG-501-79-VOL-1
Supersedes Rept. no. DG-501-70-VOL-1, AD-A045 355. See also Volume 2, AD-A087 073.

This handbook describes the Universal Documentation System (UDS). The UDS is used to formally document user agency test program support requirements and support agency capabilities and commitments to support those requirements. The UDS handbook is published in three volumes. Volume 1 describes the total UDS structure, the individual documents within the system, and the use and control of the system. Volume 1 also includes sample forms and specific instructions for the Program Introduction (PI) and Statement of Capability (SC) documents which are the first level of UDS documents.

AD-A087 073/3 MF **A01**
Range Commanders Council White Sands Missile Range NM Documentation Group
Universal Documentation System Handbook. Volume 2. Program Requirements and Operations Requirements Documents.
Nov 79, 283p Rept no. DG-501-79-VOL-2
See also Volume 1, AD-A087 072.
Availability: Microfiche copies only.

This handbook describes the Universal Documentation System (UDS). The UDS is used to formally document user agency test program support requirements and support agency capabilities and commitments to support those requirements. The UDS handbook is published in three volumes. This volume, Volume 2, describes the system and the procedure for preparation of the Program Requirements Document (PRD) and the Operations Requirements (OR) document. Each requirements document will be prepared by the user agency according to the format and policies prescribed in this volume.

16C. Missile Warheads and Fuses

PATENT-4 188 886 Not available NTIS
Department of the Navy Washington DC
Pressure Probe for Safety-Arming Device.
Patent,
Larry F. Brauer, and Jefferson O. Eaton. Filed 26 May 78, patented 19 Feb 80, 6p AD-D007 369/0, PAT-APPL-910 544
Supersedes PAT-APPL-910 544-78, AD-D005 229.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An air pressure sensing probe for providing static-dynamic differential air pressure to operate a guided missile warhead safety-arming device is

disclosed. The probe assembly is hermetically sealed to keep the device free of dirt and moisture during storage. An electrically initiated squib, fired at a predetermined time after missile launch, supplies gas pressure to the base of the probe which acts as a piston. The probe breaks a tip seal, extends laterally out from the missile, and wedges into the erect position. The base of the probe contacts a sliding punch which severs seals from two air pressure conduits and aligns air passageways with static and dynamic pressure ports in the probe. Differential air pressure is thus fed to a safety-arming device which utilizes pneumatic operation. (Author)

16D. Missiles

AD-A087 274/7 PC **A04**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Test of an Electrohydraulic Digital Actuator for Advanced Missile Systems.
Final rept. Sep 78-Sep 79,
Mark C. Twyman. Feb 80, 75p Rept no. AFWAL-TR-80-2001

This report describes the testing of a digital electrohydraulic stepper actuator developed by Bendix Systems Division under a previous Air Force R&D contract. The testing included calibration and 50 hours of durability cycling type tests. The actuator was designed for a stall torque of 2000-inch pounds at a 3000 psi differential pressure. A discussion of the problems encountered during this program and an inspection analysis of the actuator after testing are included in this report. (Author)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A087 071/7 PC **A02**/MF **A01**
Texas Univ At Austin Applied Research Labs
The Parray as an Acoustic Sensor.
Technical rept.,
Tommy G. Goldsberry. 7 Jul 80, 22p
Contract N00039-78-C-0209
Presented at the Conference on Underwater Applications of Nonlinear Acoustics, Bath, England, 10-11 Sep 79.

A parametric acoustic receiving array (PARRAY) can be narrowly defined as the volumetric, virtual array synthesized in the water volume between two high frequency transducers, called the pump and the hydrophone. It is instructive, however, to generalize the concept to include the high frequency transducers and associated pump signal generation and receiving electronics since the PARRAY is then analogous to a conventional acoustic sensor. Selection of optimum parameters for the generalized PARRAY is complicated by the fact that the basic parameters are not independent; however, by requiring that the total self-noise output of the PARRAY be minimized, one can develop systematic procedures for selecting optimum values for the basic parameters within the constraints of existing engineering technology. It follows that implementation of a practical and useful PARRAY for reception of low frequency acoustic signals in the ocean requires not only careful selection of system parameters but also careful design of electronic subsystem which must satisfy stringent performance requirements. To investigate the importance of the various parameters, a PARRAY with a 340 m pump-hydrophone separation was installed in the 45 m deep, freshwater environment of Lake Travis, TX, USA. Measurements were obtained over the 35 to 800 Hz frequency range demonstrating that the self-noise of the experimental PARRAY was below the ambient noise level in that environment.

AD-A087 211/9 PC **A04**/MF **A01**
Naval Research Lab Washington DC
A Modified Prony Method Approach to Echo-Reduction Measurements of Time-Limited Transient Signals.
Memorandum rept.,
David H. Trivett. 16 Jun 80, 63p NRL-MR-4172, AD-E000 471

A modified Prony method is presented for measuring the steady-state echo reduction of acoustic panels. The method extrapolates the steady-state amplitudes from the transient portion of the signal allowing time-limited measurements. The method is applied to measurements of square panels 76 cm on an edge and 0.95 cm-thick steel and aluminum in the frequency range of 3 - 10 kHz. The signals were time-limited to 200 microseconds (0.6 - 2.0 wavelengths) by the arrival of the diffracted signal from the panel edges. Results are compared with theoretical values and a program listing is included.

AD-A087 212/7 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Sonar Transducer Reliability Improvement Program FY 80.
Quarterly progress rept. no. 2,
Robert W. Timme. 1 Apr 80, 61p NRL-MR-4196, AD-E000 450
See also AD-A081 777.

Progress accomplished during the second quarter of FY80 in the Sonar Transducer Reliability Improvement Program is reported. Each of the six major task areas is discussed in some detail. The most significant aspects include continued investigation of candidate fill-fluids for transducers; information gained from CUALT on the TR-316 projector which had immediate application to the TR-242 projector of the AN/BQS-15 system; results of CUALT performed on 2 DT-605 hydrophones which simulated 2 years of life service; new starts made in Tasks C-1 and F-3; and the annual STRIP review which was held on 11 and 12 March 1980.

PATENT-4 187 556 Not available NTIS
Department of the Navy Washington DC
Electro-Acoustic Transducer with Line Focus.
Patent,
Charles H. Jones. Filed 5 Apr 60, patented 5 Feb 80, 4p AD-D007 390/8, PAT-APPL-020 230
Supersedes PAT-APPL-020 230-60.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A transducer for translating compressional waves in a liquid medium into electrical waves in an electric circuit and vice versa comprises an elongated transducer element having a spherically concave active face disposed with its smaller dimension between two circles of latitude spaced apart in a hemisphere a distance substantially equal to the wavelength in the liquid medium of a predetermined operating frequency.

PATENT-4 204 280 Not available NTIS
Department of the Navy Washington DC
Underwater Signal Discrimination System.
Patent,
Jack H. Slaton. Filed 21 Nov 62, patented 20 May 80, 10p AD-D007 400/5, PAT-APPL-239 384
Supersedes PAT-APPL-239 384-62.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In an underwater-target detection apparatus of the echo-ranging type wherein a receiver signal, resulting from transmission of search pulses, comprises reverberation and at times a target echo, said reverberation presenting a frequency spectrum of greater bandwidth than said target echo and presenting an amplitude-modulaton envelope generally including pulses of character similar to said search pulses, and said target echo occurring at an unpredictable frequency within a comparatively wide frequency band substanially centered upon the reverberation mean frequency, a receiver circuit for effecting discrimination of target echoes from reverberation, said receiver cicuit comprising: first filter means having a rejection notch characteristic centered upon the reverberation mean frequency, and of comparatively limited bandwidth substantially matching that of the major energy portion of said reverberation, for converting said receiver signal to a modified signal with strong attenuation of reverberation in only a correspondingly limited central portion of its frequency spectrum and without substantially affecting target echoes occurring at frequencies outside of said rejection notch; demodulator means for deriving from said modified signal a unipolar signal corresponding to the modulaton envelope of said modified signal; and second filter means having a bandpass response characteristic with upper cutoff frequency substantially equal to half said limited bandwidth of the first filter means rejection notch, for isolating, from said unipolar signal, only such signal pulses as correspond to target echoes. (Author)

17B. Communication

AD-A086 920/6 PC **A04**/MF **A01**
RAND Corp Santa Monica CA
Satellite Constellations for Worldwide and Hemisphere Coverage.
Interim rept.,
L. N. Rowell. Dec 79, 57p Rept no. RAND/N-1432-DCA
Contract DCA100-78-C-0058
See also Rept. no. RAND/R-2275/DCA, AD-A056 100.

Continuous earth-to-space communications require that at least one satellite be in view of the ground station at all times. The satellite constellations discussed in this note are designed to maximize the probability that one or more of the satellites in the constellation will always be at an elevation angle of 20 degrees or more above the horizon of the ground station. (This maximum elevation angle is based on the assumption that millimeter waves will be used for communication.) Constellations of satellites in circular orbits at synchronous and five times synchronous altitude and also in elliptical orbits are presented. Some o of the constellations are designed to maximize global coverage und station located anywhere on earth) and others are designed :o maximize coverage for the northern hemisphere. (Author)

AD-A086 939/6 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
A 96-Channel Multiplexer with Dielectric Resonators,
Uve H. Lammers, and Martin R. Stiglitz. 1979, 8p Rept no. RADC/ETR-80-0018
Pub. in Microwave Jnl., Euro-Global Edition, v22 n10 p59-62, Oct 79.

No abstract available.

AD-A086 947/9 PC **A06**/MF **A01**
MITRE Corp McLean VA
Cable Bus Applications in Command Centers.
Final rept. for FY 1979,
Steven F. Holmgren, Anita P. Skelton, and David A. Gomberg. Nov 79, 102p Rept no. MTR-79W00383
Contract F19628-80-C-0001

Microprocessor technology has advanced to the extent that the three or four lowest layers of a typical long-haul network protocol architecture may be implemented on one microprocessor-based circuit board. The impact of this evolutionary step on the

capabilities of microprocessor-based networks will be profound. This report documents the FY 79 activities of a MITRE/DCA program to determine the applicability of such a futuristic microprocessor-based cable bus local area network to World Wide Military Command and Control System (WWMCCS) command centers. The major emphasis of this program has been on a comparative analysis of cable bus and message switch local area network architectures. Potential cable bus and message switch command center applicability is measured here is terms of security, functionality, reliability, cost, flexibility and performance. Specific tasks during FY 79 included the installation of a cable bus test bed with a gateway to the ARPA network, measurement of cable bus performance, and partial implementation of a cable bus protocol architecture.

AD-A086 963/6 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
Study of 25 KHz Channel Spacing Implementation in the VHF Air Traffic Control Communications Band for Low Altitude En Route and Terminal Facilities.
Final rept.,
Charles W. Cram. Jun 80, 33p Rept no. FAA-RD-80-32

The FAA Spectrum Management Branch is responsible for making long range plans for the use of frequencies in the VHF air traffic control communications band (118 - 136 MHz). In February 1972 the decision was made to split channels in this band from 50 kHz to 25 kHz channel spacing. Plans were initially made to implement reduced channel spacing only in the high altitude en route sectors. The first of these assignments was made in June 1977. The purpose of the studies contained in this report was to form the basis of an implementation schedule for low altitude en route and terminal facilities. The effects of the newly proposed Terminal Control Areas as well as the effects of the expected growth in the number of new frequency assignments were studied and results indicated that 25 kHz channel spacing should be implemented in low altitude en route and terminal sectors in 1982 and 1984 respectively. (Author)

AD-A086 995/8 PC **A05**/MF **A01**
Naval Research Lab Washington DC
Studies on the Reduction of Intermodulation Generation in Communications Systems.
Final rept.,
G. H. Stauss, G. C. Bailey, C. D. Bond, C. A. Carosella, and A. C. Ehrlich. 7 Jul 80, 94p NRL-MR-4233, AD-E000 492

Potential means of intermodulation generation in multiplex systems are reviewed and evaluated theoretically. The dominant mechanisms involve non-ohmic junctions and ferromagnetic components. Junctions through aluminum oxide films have been studied experimentally and a possible means of improvement is described. Experimental tests of ferromagnetic components show the need to exclude them entirely from multiplex and high performance systems. With care in the choice and assembly of components, it is concluded that intermodulation signals can be kept to the level of thermal noise in most configurations. (Author)

AD-A087 108/7 PC **A03**/MF **A01**
National Telecommunications/Information Administration Boulder CO Inst for Telecommunication Sciences
Voice Performance Measurements.
Final rept.,
W. J. Hartman, and L. E. Pratt. Jun 80, 26p FAA-RD-80-71
Contract DOT-FA79WAI-013

Subjective intelligibility scores are determined for various combinations of signal-to-noise ratios, clipping, filtering, and pre-emphasis/de-emphasis. These are compared with scores derived using linear predictive coding (LPC). An overall correlation of 0.88 is obtained between the two sets of scores. (Author)

AD-A087 129/3 PC **A08**/MF **A01**
Massachusetts Inst of Tech Cambridge Man-Machine Systems Lab
Video Resolution, Frame Rate and Grayscale Tradeoffs under Limited Bandwidth for Undersea Teleoperation.
Technical rept. 1 Jul 79-30 Jun 80,
Vivek Ranadive. 15 Mar 80, 154p
Contract N00014-77-C-0256
Master's thesis.

The high costs associated with a diver working at depths approaching 100m make the use of remotely controlled visual inspection and manipulation look very attractive. When the undersea teleoperator is untethered, and acoustic communication is used, there are severe restrictions on the bandwidth of the image transmission channel. Sine the product of the Frame Rate (F), Resolution (R) and Grayscale (G) is directly proportional to the transmission band rate, for a fixed channel capacity there are tradeoffs between F, R and G in the actual sampling of the picture. A manipulator was used in the MASTER/SLAVE mode to study these tradeoffs. A mathematical model for image reconstruction was used to design a system which would allow the operator to set independently the F, R and G of the picture. This design was implemented using a commercially available charge coupled camera with its accompanying digitizer, and an electronic unit was constructed to interface with the digitizer and camera. It was the conclusion of the author that a well trained operator could perform tasks familiar to him/her with a considerably degraded picture. Furthermore, for a given task and transmission rate, some FRG combinations are more effective than others. For the particular tasks experimented with, 50,000 bits/sec was found to be a satisfactory transmission rate. (Author)

AD-A087 246/5 PC **A05**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Application of Symbolic Processing to Command and Control: An Advanced Information Presentation System.
Annual technical rept.,
Frank Zdybel, Norton Greenfeld, and Martin Yonke. Apr 80, 85p Rept no. BBN-4371
Contract N00039-79-C-0316, ARPA Order-3740

Last year the Advanced Information Presentation System (AIPS) had reached the point of a first-pass implementation. Some analysis and experimentation with that system and its internal representation structure revealed areas where the knowledge structure was inadequate -- either not epistemologically sound or not computationally reasonable. During this year we have conceptualized a new structure for the system and have begun the task of implementing our next generation AIPS system. An effort has been made to modularize the system's knowledge structure. This has led to a totally new declarative architecture for the system. This architecture promises to provide a system whose capabilities are more easily extended into the realm of 'intelligent' behavior. This project has been active in helping to evolve the KL-ONE knowledge representation language. Some of the tools which have been developed this year for implementing in KL-ONE, especially the CKLONE network building operators are described.

AD-A087 253/1 PC **A03**/MF **A01**
Harry Diamond Labs Adelphi MD
A Versatile Fiber-Optic Signal Link for EMP Testing and General Laboratory Applications.
Technical memo. Jul 77-Jul 78,
James Blackburn, and Robert Martin. Jun 80, 26p Rept no. HDL-TM-80-5

A fiber-optic analog signal link is described that was designed specifically to be used for EMP measurements. The link accepts electrical inputs in the range from millivolts to volts and converts them to optical signals which are then transmitted by optical fibers to a remote receiver. The unit is unaffected by electric fields up to hundreds of kilovolts/meter, and a bandwidth of about 130 MHz is provided; the unit has a dynamic range of approximately 30 dB. This dynamic range is extended an additional 45 dB by an internal attenuator which is commanded (by an optical fiber link) to insert a fixed attenuation in the range of 0 to 45 dB between the input connecter and transmitter. A self-calibrator is also commanded by the same link. An unusual circuit feature is the use of a single electro-optic device to perform both light-emitting diode and detector functions. (Author)

AD-A087 258/0 PC **A06**/MF **A01**
MITRE Corp Bedford MA
Requirements Definition and Design Guidelines for Man-Machine Interface in C3 System Acquisition.
Technical rept.,
Sidney L. Smith. Jun 80, 120p M80-10, ESD-TR-80-122
Contract F19628-80-C-0001

The man-machine interface (MMI) represents a significant proportion of the hardware and software investment in Air Force C3 system acquisition. Early definition of MMI requirements and provision of design guidance in functional specification may be critical to successful system development. Tentative design guidelines are proposed in this report for further elaboration, trial application and subsequent evaluation in collaboration with selected ESD/MITRE program engineering efforts. (Author)

AD-A087 259/8 PC **A04**/MF **A01**
Arcon Corp Waltham MA
Ionospheric Modeling and Propagation Analysis.
Final technical rept. Nov 76-Sep 79,
David C. Miller, and Joseph Gibbs. Apr 80, 75p
RADC-TR-80-29
Contract F19628-77-C-0051

This report describes several studies and the development of computer techniques toward improving the capability of predicting and assessing HF propagation through the ionosphere. These studies included the development of vertical electron density models which can accurately represent observed oblique and vertical ionograms. These models have been represented by a series of functions which describe the individual ionospheric layers and which are analytically integratable to yield expected ray path trajectories. A computer program has been written which incorporates these features and yields results which are two orders of magnitude faster than those available using conventional numerical ray tracing techniques. The technique has been applied to several studies including the simulation of the backscatter leading edge of oblique ionograms and the determination of HF circuit parameters for a specified ground coverage. The results are presented as a function of the change in individual ionospheric layer parameters. (Author)

AD-A087 399/2 PC **A04**/MF **A01**
ARINC Research Corp Annapolis MD
FAA Communications Cost Model User's Guide. Revised,
W. Kolb, and I. Gershkoff. Apr 80, 69p 1339-01-6-2132, FAA-ASP-80-6
Contract DOT-FA77WA-4018
See also Rept. no. FAA-ASP-80-7, AD-A086 020 and Rept. no. FAA-ASP-80-8, AD-A085 835.

The FAA Communications Cost Model User's Guide provides information regarding applications, requirements, and operation of the model, describes user input data and procedures for setting up a run, and gives a sample problem showing how each data card is set up. Appendixes provide facilities and equipment (F&E) and operations and maintenance (O&M) parameters assumed in the model and describe each output report.

AD-A087 417/2 PC **A09**/MF **A01**
Network Analysis Corp Great Neck NY
Packet Radio Deployment Study.
10 Apr 80, 193p Rept no. FR.207.01-R1
Contract DAAK80-79-C-0763

This report documents the results of the Packet Radio Deployment Study whose objective is to assess the potential of the Packet Radio technology for satisfying communications requirements in the military environment. The focus of this study has been on the following three tasks: Enhancements of the Packet Radio Simulation Program (PRSIM); Implementation of a Military Scenario Model; and Design, Routing and Performance Analysis of Packet Radio Networks for the Military Scenarios.

ED-176 799 Not available NTIS
Assessing the Content of Instructional Television Programs for Use in Formative Evaluation,
Brenda Jochums. 10 Apr 79, 59p
Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. on April 10, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The development of content analysis instruments sensitive to the instructional, social, and value-laden content of a television series, was necessary because of formative evaluation needs to establish the congruity of the actual program content with the intended content and to assess the hidden curriculum. Because issues ranged widely, four content analysis instruments were constructed and the development of each is discussed. Four stages of content analysis methodology and use are (1) the identification of issues of concern, (2) determination of needed instrumentation, (3) construction and revision of the instruments and (4) data collection and reporting. Instrument development methodology is focused upon with an example of data and reporting for the Demographic Balance checklist.

ED-178 080 Not available NTIS
Council of Europe, Strasbourg (France). Committee for Out-of-School Education and Cultural Development.
Community Control of Local Radio,
Peter M. Lewis. 19 Nov 76, 35p
For related document, see IR-007 804.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study was designed to determine to what extent local communities control the local radio which serves them, by what formal mechanisms their control is secured, and the underlying assumptions and goals which govern the practice of the professionals who have charge of the facilities. Two British radio stations, BBC Radio Bristol and the Independent Local Radio (ILR) station--Thames Valley Broadcasting in Reading, are reviewed, as is STAD Radio Amsterdam. Contexts in which each of the stations operate are provided, giving background information on their creation and leading into separate discussions of each station's profile, including start date, studio address, area served, frequency, staff, finances, hours of operation, programming and operations control. In each case the means and forms of local input are examined. An appendix gives a brief description of two Canadian radio stations, Radio Cinq, Montreal, and Vancouver Co-op Radio.

PATENT-4 203 164 Not available NTIS
Department of the Navy Washington DC
Secure Sonar Communication System.
Patent,
Robert D. Isaak, William E. Klund, Woodrow H. Littrell, and Richard G. Stephenson. Filed 6 Mar 61, patented 13 May 80, 13p AD-D007 401/3, PAT-APPL-093 811
Supersedes PAT-APPL-093 811-61.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A secure sonar communication system for transmitting and receiving intelligence signals within an aqueous medium comprising in combination means for generating an electrical pseudo random noise signal within a predetermined bandwidth, means connected to said pseudo random noise generating means for selectively driving same at one of a plurality of predetermined frequencies, keying oscillator means adapted to selectively produce an output of one of a plurality of predetermined frequency signals, a balanced modulator means coupled to said psuedo random noise signal generating means and said keying oscillator means for mixing the output signals therefrom, bandpass filter means connected to the output of said balanced modulator means for passing the upper sideband thereof, means for receiving an electrical pseudo random noise signal, transducer means, said transducer means being capable of broadcasting acoustical energy upon excitation by the upper sideband from the aforesaid bandpass filter means and in proportion thereto and for producing an electrical pseudo random noise output signal in proportion to a received acoustical pseudo random noise signal, and means connected to the output of said bandpass filter means and the input of said electrical pseudo random noise signal receiving means for selectively connecting same to said transducer means during broadcasting and receiving operations respectively. (Author)

PATENT-4 207 625 Not available NTIS
Department of the Navy Washington DC
Doppler Compensator for Heterodyne Correlation Devices.
Patent,
William E. Klund, Woodrow H. Littrell, Nomah M. Littrell, and Robert D. Isaak. Filed 6 Mar 61, patented 10 Jun 80, 5p AD-D007 411/2, PAT-APPL-093 814
Supersedes PAT-APPL-093 814-61.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a sonar communication system, a transceiver for receiving doppler signals, a local oscillator for producing a first output signal of given frequency, a translation resolver connected to said local oscillator for a regulating said first output signal, modulator connected to said transceiver resolver for mixing said received doppler signals and said regulated first output signal, a filter coupled to said modular for filtering said mixed signals, a precision clock oscillator adapted for producing a second output signal, a proportional resolver electrically coupled to said precision clock oscillator for regulating the frequency of said second output signal, a signal generator connected to said proportional resolver and driven by said regulated second output signal for generating a third output signal, a filter coupled to said signal generator for filtering said third output signal, a correlator electrically coupled to the outputs of said mixed signal filter and said third output signal filter for correlation thereof, a drive motor, means connected to said drive motor for regulating the speed and rotation thereof, and gear means interconnecting said drive motor and said translation and proportional resolvers for driving same at a predetermined speed ratio. (Author)

PB80-205677 PC **A03/MF A01**
Technology and Economics, Inc., Cambridge, MA.
The Emergence of Pay Cable Television. Volume I: Overview.
Final rept.,
Ralph Lee Smith, and Raymond B. Gallagher. Jul 80, 42p
Contract NT-79-SAC-00027

This is the overview volume of a three volume study of events and trends in the cable television and pay cable television fields. The volume summarizes information in the background and data volumes that constitute Volumes II and III of the report. In addition it contains commentary and views developed by the contractor as it conducted the survey.

PB80-208150 PC **A04/MF A01**
National Telecommunications and Information Administration, Washington, DC.
National Information Policy and Broadcasting.
May 78, 66p

The analysis examines the policies relating to commercial broadcasting in the context of national information policies. Broadcasting differs from other information vehicles primarily in the methods by which it accesses, manages, and disseminates information. This examination will discuss these differences and the policies that flow from them.

PB80-209968 PC **A20/MF A01**
Technology and Economics, Inc., Cambridge, MA.
The Emergence of Pay Cable Television. Volume II: Background and Data. Final Report,
Ralph Lee Smith, and Raymond B. Gallagher. Jul 80, 464p
Contract NT-79-SAC-00027
See also Volume 1, PB80-225677.

This is the basic background and data volume of a three volume study of events and trends in the cable television and pay cable television fields. The volume set forth substantial data and information regarding the cable, pay cable, subscription television (STV), and multipoint distribution service (MDS) industries.

17C. Direction Finding

PATENT-4 198 634 Not available NTIS
Department of the Navy Washington DC
Optical Autocorrelator Signal Processor.
Patent,
James L. Jernigan, and Thomas F. O'Neill, Jr. Filed 30 Sep 71, patented 15 Apr 80, 5p AD-D007 407/0, PAT-APPL-185 418
Supersedes PAT-APPL-185 418-71.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A correlation receiver for detecting and measuring the angle-of-arrival of radio frequency signals, including two antennas, a correlation processor, and a crt display. (Author)

PATENT-4 207 622 Not available NTIS
Department of the Navy Washington DC
Direction-Finding Array of Crossed Dipoles.
Patent,
Harry B. Miller. Filed 13 Apr 78, patented 10 Jun 80, 8p AD-D007 396/5, PAT-APPL-895 838
Supersedes PAT-APPL-895 838-78, AD-D005 225.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A direction-finding array system which uses a plurality of hydrophones in a crossed dipole configuration and a phase-detection system. It is basically a time-of-arrival (TOA) system which is modified to act like a phase-detection system and is able to share much of the electronics of existing acoustic intercept receivers. Acoustic signals of a high frequency generated by an acoustic target under investigation are apparently heterodyned to obtain corresponding signals of an appropriate lower frequency. The apparently heterodyned signals are then processed in two identical processors giving rise to two outputs which are applied to x- and y-axes of a cathode ray of oscilloscope or the like to obtain unambiguous bearing information about the acoustic target. Three dimensional bearing angle information is obtained by using a third processor which is identical to the two processors used in a two dimensional case. (Author)

17D. Electromagnetic and Acoustic Countermeasures

AD-A086 913/1 PC **A03/MF A01**
Probe Systems Inc Sunnyvale CA
Optical Excision Program. Electronic Clipper.
Rept. for 1 Apr 79-31 Jan 80.
Jan 80, 42p Rept no. PSI-ER-5538-02
Contract N00039-79-C-0141, ARPA Order-3621

The ability to significantly reduce the vulnerability of spread spectrum radar communication or intercept systems to narrowband jammer interference has been successfully demonstrated in the laboratory. The interference signal levels were attenuated by the self-adaptive frequency selective limiting properties of an optical processor invented by PROBE SYSTEMS, INC. The key component in these tests was a standard microchannel plate photomultiplier detector that, when exposed to narrowband signals, would saturate and at the same time amplify low-level broadband signals. This electronic clipping of high power spectral density signals was responsible for the successful demonstration of the feasibility of using a microchannel plate photomultiplier for optical excision of interference.

AD-A086 914/9 PC **A04**/MF **A01**
Probe Systems Inc Sunnyvale CA
Optical Excision Program, Optical Clippers.
Rept. for 1 Jul 79-31 Mar 80,
Dave Jackson. 15 Apr 80, 68p Rept no. PSI-ER-5538-03
Contract N00039-79-C-0141, ARPA Order-3621

The ability to significantly reduce the vulnerability of broadband receivers to narrowband jammer interference has been successfully demonstrated in the laboratory. The interference signal levels were attenuated by the self-adaptive frequency selective limiting properties of an optical processor invented by PROBE SYSTEMS, INC. This report describes the evaluation of optical clipper materials that, when placed in the optically-generated spectrum of a broadband RF signal, would selectively attenuate narrowband signals. The three optical clippers that were evaluated were: (1) a PROM developed by Itek Corporation and supplied by Naval Research Laboratory, (2) a selection of photodichroic crystals developed and supplied by Naval Research Laboratory, and (3) a photochromic glass purchased from Corning. The most successful results were obtained with an optical memory developed by Itek and named the PROM. This device, when exposed to narrowband signals, affects the polarization of the transmitted light and at the same time passes those portions of broadband signals not covered by narrowband signals. By coherently detecting the transmitted light, the optical processor continuously reconstructs the broadband signals without the interference that could have degraded or even prevented further signal processing or display.

AD-A086 968/5 PC **A04**/MF **A01**
Electronics Research Lab Adelaide (Australia)
Radar Emitter Recognition Using Pulse Repetition Interval.
Technical rept.,
R. M. Hawkes. Mar 80, 59p Rept no. ERL-0132-TR

A method for estimating radar emitter pulse repetition interval parameters for intercepted emissions is presented. Adaptive parameter estimates based on certain measurements are derived. The measurements are obtained by a readily implementable observation procedure. The approach can deal with emitters with variable pulse repetition interval in a dense environment. Computer simulation results for the techniques are included. (Author)

AD-A087 358/8 PC **A07**/MF **A01**
Decision-Science Applications Inc Arlington VA
Development and Evaluation of an Emissions Control Decision Aid.
Interim rept. Jul 78-Jul 79,
David F. Noble, George F. Pugh, James E. Densmore, Jr., and Max T. Nunenkamp. Jul 80, 146p Rept no. DSA-246
Contract N00014-77-C-0322

The DSA emissions control decision aid assists with the design and evaluation of mission control plans. As part of the Office of Naval Research operational decision aiding program, the aid was formally evaluated in tests conducted by an independent ONR consultant. This report describes modifications to the aid, preparation of user's manuals for test subjects, and development of scenarios for the test program. Aid improvements occurred primarily in response to suggestions during briefings, and suggest general principals of display design. The process for scenario development described here insured a set of test scenarios appropriate for an evaluation program. The user's manuals, included in the appendices describe how to use the aid to prepare EMCON plans. (Author)

17E. Infrared and Ultraviolet Detection

AD-A086 971/9 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
Application of Interframe Filtering to Line Scanned Infrared Imaging Systems.
Technical memo.,
G. V. Poropat. Nov 79, 23p Rept no. ERL-0112-TM

The use of frame storage in an imaging system to implement interframe filtering is analysed and its effects on image signal to noise ratio determined. Simulation of interframe processing on imagery obtained using an AGA Thermovision is described. The application of interframe filtering to real time imaging systems is examined. (Author)

AD-A087 173/1 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Improved Platinum Silicide IRCCD Focal Plane,
R. Taylor, L. Skolnik, B. Capone, W. Ewing, and F. Shepherd. 1980, 10p Rept no. RADC/ETR-80-0024
Pub. in SPIE: Advances in Focal Plane Technology, v217 p103-110 1980.

No abstract available.

AD-A087 286/1 PC **A03**/MF **A01**
Hughes Research Labs Malibu CA
Advanced Silicon Material Development for LADIR.
Interim rept. 15 Aug 78-15 Aug 79,
H. Kimura, and O. J. Marsh. Jun 80, 48p
Contract F33615-78-C-5062

This interim report gives dopant distribution results from several float-zoned <100> silicon crystals. Uniformity of Ga improves as the growth rate is decreased and the rotation rate during growth is increased. This results agree qualitatively with diffusion theory and show promise of substantial uniformity improvement over state of the art Si:Ga material for IR detector applications. (Author)

17G. Navigation and Guidance

AD-A086 902/4 PC **A05**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Air Traffic Control/Active Beacon Collision Avoidance System Knoxville Simulation.
Final rept. Feb-Mar 79,
A. Adkins, B. Billmann, R. Strack, and J. Windle. May 80, 93p FAA-NA-79-54, FAA-RD-80-5
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This project was conducted to assess the performance of an active mode Beacon Collision Avoidance System (BCAS) operating in a moderate-density terminal Air Traffic Control (ATC) environment. The specific objectives addressed the impact of active BCAS on controllers and control procedures, the performance of new vertical speed limit (VSL) logic, the effectiveness of an alternate desensitization method, and the impact of 'no miss distance' filtering. An additional objective was to characterize and validate the active BCAS algorithm in terms of number, duration, and location of alerts and resolution effectiveness. The tests were conducted using the ATC Simulation Facility at the National Aviation Facilities Experimental Center during February and March 1979. Analysis of results indicated that an active BCAS system provided an effective aircraft separation assurance system as a backup to the ATC system and had no adverse effect on controllers or control procedures. The VSL logic modifications significantly reduced the BCAS activity for overflight traffic relative to the BCAS alarm rate in the full BCAS tests. An alternative desensitization method to range and altitude, based only on altitude, proved to be reasonably effective. The lack of horizontal miss distance information with active BCAS resulted in an increase in the positive command rate when compared to the full BCAS Knoxville results. (Author)

AD-A087 018/8 PC **A14**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Air Traffic Management: Civil/Military Systems and Technologies.
Conference proceedings,
I. M. Pedder, Joseph T. Saganowich, Rudiger Seifert, Gunther Och, and James O. Boone. Feb 80, 307p Rept no. AGARD-CP-273
Presented at the Guidance and Control Panel Symposium, 9-12 Oct 79, Copenhagen (Denmark). See also Rept. no. AGARD-CP-273-SUPPL dated Mar 80, AD-C021 065.

In the evolution of Air Traffic Control certain important phases can be identified. Until recently, these phases were usually characterized by the advent of a particular technical or technological development. A first phase which roughly covered the period 1930-1950 was characterized by manual operation, visual surveillance, time separation of aircraft, the use of radio for communication and low frequency aids for navigation. A second phase which extended, say, from the late 1950's until about 1970 was essentially characterized by the introduction and extensive use of two techniques: radar, both primary and secondary, for surveillance and VOR/DME for navigation. Then, from the late 1960's onwards, the introduction of the computer in to ATC opens a new era: flight plans and radar data processing, synthetic data displays and digital communications. In some systems, automation is already providing systematic back-up for the controller and this phase of automation is only just starting. In the early 1970's, a new and completely different phase started in parallel and is continuing. It is a phase not related to any particular technological developments but one born of concern shown by both the users of the airspace and the authorities responsible for the ATC services for economy and concern expressed by the community regarding the conservation of natural resources, in general, and the impact which further development of aviation can have on ecology, in particular. In this era, demands and constraints issued from various sources are no longer simple and may even contain some degree of contradiction. Consequently, present overall requirements for aviation operation have reached a high level of complexity.

AD-A087 037/8 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB Il
TRACALS Evaluation Report. SSILS Initial Evaluation Report, AN/GRN-29 Runway 34. Dyess AFB, Texas.
Final rept.,
Joseph P. Coyle, and David E. Thibodeau. 16 Jun 80, 94p Rept no. 80/66N-203

This report presents the results of the 31 January - 26 February 1980 TRACALS Evaluation of the Dyess AFB AN/GRN-29(V) SSILS serving Runway 34. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A087 041/0 PC **A04**/MF **A01**
Raytheon Co Bedford MA Missile Systems Div
Modular Digital Missile Guidance.
Final rept. 1 Jan-31 Oct 79 on Phase 6,
Frank J. Langley, John Demetrick, and Frank Marchilena. 30 Jan 80, 63p BR-11856, ONR-CR233-052-6
Contract N00014-75-C-0549
See also phase 5, AD-A072 544.

Higher throughput general-purpose processors have traditionally been the domain of Schottky-bipolar or CMOS-SOS integrated circuit technology with attendant multi-component packaging logistics and support software problems. In addition, the modular operational software has proven difficult to achieve in practice. To combat these deficiencies, a super-federated high-speed, multi-processor architecture has been explored using standard industry 16-bit microprocessors. The resulting design evolved in this study employs a time-phased ring approach to high throughput with single processor programming simplicity. Further, modular software has been achieved by assigning one microcomputer to each major algorithm. (Author)

AD-A087 138/4 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ

Modeling Active Beacon Collision Avoidance System (BCAS) Measurement Errors: An Empirical Approach.
Final rept. Oct 78-Mar 79,
B. Billimann, J. Thomas, T. Morgan, and J. Windle. May 80, 30p FAA-NA-80-3, FAA-RD-80-34

The Active Beacon Collision Avoidance System (BCAS) algorithm evaluation required the development of accurate input error models. This document describes a methodology used to model Active BCAS errors associated with the measurements of altitude and range. The models were required for use in the analysis of Active BCAS resolution performance in an error-degraded environment. A time series analysis of two independent sets of data from Active BCAS surveillance tracker test flights showed that Active BCAS measurement errors are highly sequentially correlated (auto-correlated) and time dependent. This indicated that dynamic (time dependent) models are more appropriate than the previous static (time independent) models. The analysis showed that range and altitude measurement errors could be characterized using first and second order autoregressive processes. The improvement in the characterization of the errors was achieved without increasing the model complexity. The number of parameters was increased by one compared to the number of parameters of the previous static models. With availability of more sets of data, not necessarily larger sets, the methodology could be applied to increase the accuracy of the parameter estimates. The methodology, described herein, could be applied to develop altitude and range measurement error models for other collision avoidance systems in which similar tracking procedures were used. (Author)

AD-A087 199/6 MF **A01**
Coast Guard Washington DC Office of Research and Development
Communications Requirements for a Loran-C Position Monitoring System for VTS Valdez, Alaska.
Final rept.,
T. M. Drown. Jun 80, 45p Rept no. USCG-D-36-80
Availability: Microfiche copies only.

The Coast Guard is investigating alternative means to provide increased surveillance capability in its Vessel Traffic Service (VTS) at Valdez, Alaska. The requirement is to extend active position monitoring of ships throughout Prince William Sound. One method of surveillance is to transmit Loran-C time differences from each ship to VTS Valdez for display and storage. This document defines the requirements for a Loran-C position monitoring system using the existing VHF-FM communication network. (Author)

AD-A087 235/8 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center Atlantic City NJ
Analysis of Flight Service Station Consolidation. Phase III: Indianapolis, Fort Wayne, and Terre Haute Flight Service Stations.
Final rept. Aug-Sep 77,
Lee Paul, Ephraim Shochet, and James D. Talotta. Jul 80, 58p FAA-CT-80-7, FAA-RD-80-57

A study was made to evaluate the effect of consolidating the Indianapolis, Terre Haute, and Fort Wayne Flight Service Stations (FSS) into one facility. This report documents the estimated effect of consolidation on specialist productivity, distribution of workload, staffing requirements, and service to the user. Queuing theory was used to determine what one might expect in the way of number of delays, amount of delay, number waiting, etc. In addition, analyses were made to estimate the effect of decreasing the number of specialists while assuming the same demand and increasing the demand while assuming the same number of specialists. The data collected clearly supports the expected value of consolidation and must be regarded as an encouraging indication that the present system can be made to operate more efficiently and provide better service to the users. Providing the users access to a larger number of specialists than are normally available at the nearest FSS should permit better service with fewer delays and a more equitable distribution of the workload, other things being equal. (Author)

AD-A087 243/2 PC **A20**/MF **A01**
Sterling Systems Inc Washington DC
Assessment of the Capacity of the Automated Radar Terminal Systems (ARTS IIIA) for the Years 1980-1990.
Final rept. Oct 78-Apr 80,
William Pailen, Hugh C. Wintermoyer, and Robert Sittler. Jun 80, 454p FAA-RD-80-51
Contract DOT-FA78WAI-942
Prepared in cooperation with ARCON Corp., Waltham, MA.

The capability of the ARTS IIIA to support future air traffic growth and functional enhancements through 1990 is examined. The approach used is to investigate a few high traffic density sites which are representative of the three current terminal system configurations: single sensor sites (Detroit); dual sensor sites (Chicago, Los Angeles); and Metroplexes (New York). Loading factors are determined for each model site. These factors include the number and type of sensors and displays, the instantaneous traffic counts, and functional capability. The loading parameters are then used as inputs to a processing model, developed in this study, in order to determine if the ARTS IIIA can provide adequate processing capacity. The loading parameters are also used to develop estimates of memory requirements. The results of the study indicate that processing capacity limitations, if not overcome, will likely constrain functional growth at Metroplex facilities but will present no problems for single and dual sensor sites. Current memory capacity limitations are shown to present significant problems for both Metroplexes and dual sensors sites.

AD-A087 311/7 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
VHF Omnidirectional Radio Range (VOR) Electromagnetic Spectrum Measurements.
Final rept.,
Garth M. Kanen. 18 Oct 78, 47p

This report presents VOR electromagnetic spectrum measurement techniques applicable to site survey, installation, maintenance, and interference alleviation activities. Spectrum displays of the VOR emission contain valuable system performance information. These displays contain significant detail which can be used for analyzing the performance of various parts of the system. A basic set of VOR radiated spectrum displays taken at specific ground locations would be of value as a part of the basic facility records. Subsequent display samples could be taken remotely without disturbing the facility. Comparison of these with the site records would give insight into system performance and assist in the maintenance and flight inspection activities. (Author)

AD-A087 405/7 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report. McGuire AFB, New Jersey, 5-11 December 1978.
Final rept.,
John D. Collier. 9 Mar 79, 93p Rept no. 78/66C-151

The purpose of the evaluation performed, 5-11 December 1978, was to define the capabilities and limitations of the air traffic control (ATC) communications systems. This report includes the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications at McGuire AFB until there is a deletion, addition, relocation of equipment, or a change in the horizon profile.

AD-A087 406/5 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report. Aviano AB, Italy, 19-27 February 1980.
Final rept.,
Allen C. Mathews, and Robert Romanski. 1 May 80, 92p Rept no. 80/66C-199

The purpose of the evaluation, performed 19-27 February 80, was to define the capabilities and limitations of the ATC communications system. This report includes the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile.

AD-A087 407/3 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report. England AFB, Louisiana, 19-29 February 1980.
Final rept.,
Robert S. Antonio, and Donald F. Ambrose. 12 May 80, 95p Rept no. 80/66C-205

The purpose of the evaluation, performed 19-29 February 1980, was to define the capabilities and limitations of the ATC communications system. This report includes the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile.

AD-A087 408/1 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Initial Evaluation Report. Airport Surveillance and Precision Approach Radar (AN/GPN-24) Nellis AFB, Nevada, 10 December 1979-6 March 1980.
Final rept.,
James R. Minsterl. 16 May 80, 92p Rept no. 80/66R-208

This report presents data collected from 10 December 1979 to 6 March 1980 to define the capabilities and limitations of the radar facility at Nellis AFB, Nevada. This report includes descriptions of the useable radar coverage and tracking capabilities, analysis of all flight and equipment performance data, and the performance predictions for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or unitl a significant change occurs in the horizontal profiie. (Author)

PB80-207145 PC **A03**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Fourier Transformation of the Nonlinear VOR (Very-High-Frequency Omni-Directional Range) Model to Approximate Linear Form,
Dominic F. Vecchia. Jun 80, 31p NBS-TN-1021

This technical note describes a method for transforming a particular nonlinear regression model to a form which is approximately linear in the unknown parameters. The technique involves computation of the fourier coefficients for a set of sample data and uses phase variables to estimate the parameters. The phase spectrum transformation is employed to obtain bearing angle estimates for a model associated with the Very-High-Frequency Omni-Directional Range (VOR) aircraft navigation system. The transformation provides a model linear in relevant phase parameters. Thus, estimation of VOR bearing angle utilizes existing statistical theory. Finally, it is shown that certain generalizations of the VOR model also are reduced to approximate linear form by the phase spectrum transformation.

PB80-208168 PC **A04**/MF **A01**
Office of Technology Assessment, Washington, DC.
Proceedings of the OTA Seminar on the Discrete Address Beacon System (DABS).
Background paper.
Jul 80, 57p OTA-BP-T-4

This report was prepared as a result of a one-day seminar held on January 31, 1980, to examine

some of the impacts on the aviation system of the FAA's proposed implementation of the Discrete Address Beacon System (DABS) and the Automatic Traffic Advisory and Resolution Service (ATARS). The seminar, requested by the House Committee on Appropriations, Subcommittee on Transportation, reviewed the following: the impact of DABS/ATARS on the Air Traffic Control Radar Beacon Service; the compatibility of DABS/ATARS equipment with upgraded military equipment; and the extent to which FAA is and should be coordinating the development of DABS/ATARS with the International Civil Aviation Organization.

17H. Optical Detection

AD-A086 912/3 PC **A03**/MF **A01**
Probe Systems Inc Sunnyvale CA
Optical Excision Program. Holographic Local Oscillator.
Rept. for 28 Dec 78-31 Jul 79,
Dave Jackson. Jul 79, 36p Rept no. PSI-ER-5538-01
Contract N00039-79-C-0141, ARPA Order-3621

a new technique for coherently detecting optical signals has been demonstrated in the laboratory. Prior to this work, conventional interferometer techniques were the only method by which the amplitude and phase of an optical signal could be measured, but the mirrors and beam-splitters required careful alignment and introduced a susceptibility to microphonic noise and laser coherence effects. Reported here are the results of an effort to design process, and evaluate holograms capable of producing the optical local oscillator needed in coherent, realtime optical signal processors. For more than a decade it has been known that an optical spectrum analyzer that has an acousto-optical input transducer can reconstruct the signal by coherently detecting the signal spectrum. This type of processor provides the capability to continuously form the spectrum of a signal, modify the signal spectrum, and then output a time-waveform signal reconstructed from the modified spectrum. This capability has been overlooked for the past decade partly because of the modest performance of the optical components needed in the processor. Recent advances in Bragg cell and detector technology now permit the development of wideband, high-resolution optical processors with performance orders to magnitude beyond that forecasted for future digital signal processors.

PATENT-4 184 767 Not available NTIS
Department of the Navy Washington DC
Frequency Agile Optical Radar.
Patent,
Richard S. Hughes, and Keith L. Gardner. Filed 21 Jul 75, patented 22 Jan 80, 8p AD-D007 408/8, PAT-APPL-601 237
Supersedes PAT-APPL-601 237-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A frequency agile optical radar system including a frequency agile laser source coupled with an extracavity dispersive element in such a manner as to radiate into space specific optical frequencies correlated with specific elevation angles measured from the horizontal. Laser radiation reflected from an object in space is detected by a staring detector system and the wavelength of the reflected optical energy determined therefrom. the elevation angle of the object in space is correlated with the optical frequency determination and coupled together with target range and axiumuth angle so that the position and range to an object in space may be determined. (Author)

PATENT-4 203 108 Not available NTIS
Department of the Navy Washington DC
Underwater Detection System.
Patent,
Hrant Eknayan. Filed 18 Aug 61, patented 13 May 80, 4p AD-D007 402/1, PAT-APPL-135 399
Supersedes PAT-APPL-135 399-61.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for detecting the presence and position of submerged objects below the ocean surface, comprising in combination means for projecting a beam of electromagnetic rays falling within the 0.4800 to 0.5800 micron wave band in the direction of an object to be detected, a receiver for receiving rays reflected from an object in the path of said projected beam, said receiver comprising a spherically shaped body having an aperture formed in the area which is in contact with the ocean water to permit said reflected rays to enter and impinge on the inner surface of said spherically shaped body, inlet and outlet means for circulating dry cooled constant temperature nitrogen in said spherically shaped body under sufficient pressure to prevent ocean water from entering said spherically shaped body, and a plurality of lead sulfide cells mounted on the inner surface of said sphere for generating an output signal proportional to the intensity and angle of entry of the reflected rays. (Author)

17I. Radar Detection

AD-A086 962/8 PC **A06**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Moving Target Detector Data Utilization Investigation.
Data analysis rept. 1975-1976,
F. R. Castella, M. J. Feil, J. T. Miller, and C. L. Roe. Mar 80, 109p JHU/APL/FP8-T-041, FAA-RD-80-29
Contract DOT-FA74WA-3423
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Moving Target Detector (MTD), developed by M.I.T.'s Lincoln Lab., the Massachusetts Institute of Technology (MIT) Lincoln Laboratory under contract to the Federal Aviation Administration (FAA), M.I.T.'s Lincoln Lab., was designed as an improved video processor for use with the Airport Surveillance Radars within the Automated Radar Terminal System (ARTS) III automated Air Traffic Control (ATC) system. This device interfaces between the analog radar system and the digital automatic tracking system to provide automatic target detection and false alarm regulation. In addition to range, bearing, and amplitude data, the MTD provides doppler information on detected targets. This data is in the form of unconsolidated reports that are to be centroided and tracked to provide a primary radar data base for ATC functions. In order to evaluate the potential benefits of this MTD data on the ATC tracking operation, the present study was conducted using experimental data gathered by the FAA and Lincoln Laboratory with an FPS-18 radar at the National Aviation Facilities Engineering Center during the summer of 1975. The principal investigations focus on: development of a centroid algorithm for extracting significant target features; and using these features within the subsequent tracking function.

AD-A086 964/4 PC **A06**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Electrical Engineering
Optical Processors for Adaptive Phased Array Radars.
Final technical rept. 21 Aug 78-21 Aug 79,
David Casasent. Mar 80, 121p RADC-TR-80-53
Contract F30602-78-C-0272

Three new optical signal processing techniques and architectures were considered for advanced adaptive phased array radar signal processing. Use of a residue arithmetic optical processor was studied. A new correlation approach to residue arithmetic operations was developed together with new optical decimal/residue and residue/decimal converters, a residue arithmetic adder and matrix processor. Format control of the data in such systems and availability of the necessary components are of concern in this type of optical processor. A multi-channel optical frequency plane correlator in which the received signals at the N array elements are correlated with a reference element was studied. The output correlation plane pattern obtained is slit integrated in angles by a special detector to yield a map of the angular distribution of the noise field. From this output, an inverse DFT digital post-processor was shown to yield the desired weights under restrictive cases. A time integrating acousto-optic correlator version of this system appears preferable, since it uses more available 1-D transducers and provides the high center frequency and large time bandwidth products necessary. An iterative optical processor was then considered. This system uses a linear LED input array, 2-D mask and 1-D photodetector array to perform a vector-matrix multiplication. With feedback, this system can solve the adaptive radar equation using a new iterative algorithm.

AD-A087 010/5 PC **A04**/MF **A01**
Parke Mathematical Labs Inc Carlisle MA
Ground Range and Bearing Error Determination and Display for an OTH Radar System with an Arctic Trough Ionosphere.
Final rept. Oct 76-Oct 79,
Dean Bandes, and Theodore B. Barrett. Feb 80, 51p 0296-FR-2, AFGL-TR-80-0055-PT-2
Contract F19628-76-C-0296
See also Part 1, AD-A086 837.

This report describes the algorithms used to determine range and bearing errors which might be incurred in an OTH radar system where the propagating medium includes an arctic trough. Several types of plots for displaying this error information are described along with an example. (Author)

AD-A087 051/9 PC **A11**/MF **A01**
Stanford Univ CA Stanford Electronics Labs
Second-Order Electromagnetic and Hydrodynamic Effects in High-Frequency Radio-Wave Scattering from the Sea.
Technical rept.,
Donald LeRoy Johnstone. Mar 75, 241p Rept nos. SU-SEL-75-004, TR-3615-3
Contracts N00014-75-C-0356, N00014-69-A-0200-6012
Sponsored in part by Contract N00014-67-A-0112-0080 and Grant NGL-05-020-014.

A theoretical analysis of high-frequency radio-wave scattering from the sea establishes relationships between the doppler continuum of observed radar echoes and the heights and propagation directions of ocean-surface waves. This provides new techniques for the remote sensing of sea-surface conditions by either monostatic or bistatic radars. Integral expressions for the incremental surface radar cross section per unit frequency are derived, assuming a slightly rough time-varying random surface for the sea. These expressions are a function of surface-height directional spectra and contain electromagnetic and hydrodynamic effects to second order. First-order terms confirm that Bragg scattering from wave trains of a single frequency and direction is responsible for the discrete lines in observed doppler spectra; the second-order terms, which provide a continuum, are interpreted physically by a double Bragg-scattering process that involves an intermediate-scattered radio wave that may be either freely propagating or evanescent. A coordinate transformation provides paths of integration that can be related to specific features in observed doppler spectra and also results in a numerically efficient method for the evaluation of the second-order radar cross sections.

AD-A087 213/5 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Radar EMI at Sea.
Memorandum rept.,
Louis J. Lavedan. 28 Jan 80, 22p NRL-MR-4082, AD-E000 449

As quantity and complexity of electronic systems on Navy ships increases, so does the probability of RF interference between systems, even those located on separate ships. This report briefly describes the coupling mechanisms possible between 200 MHz and 4000 MHz and supplies data in the form of graphs and describes a method whereby the magnitude of the interference can be quickly calculated for the various sea environments.

AD-A087 391/9 PC **A03**/MF **A01**
Science Applications Inc Tucson AZ
Radar Test Range Construction.
Final rept.,
Dino Sofianos, and Dave Phillips. 23 Jun 80, 35p
Rept no. SAI-TR-04-165-04
Contract F33657-79-C-0178

The purpose of this report is to present the placement and configuration of the radar test range in Gila Bend, Arizona. The range has been designed to test the performance of the Flexible Test Bed (FTB) digital processor. The methodology and conceptual design of the radar test range are presented in a previous report. Construction of the radar range included locating appropriate test sites, installing the reflectors and obtaining ground truth data. Four separate radar range sites were constructed in order to optimize each site for a particular set of measurements. The radar test sites were named after the particular image quality parameters to be measured. The four radar range sites constructed were: (1) Calibration, (2) Linear, (3) Non-linear, and (4) Clutter-to-noise.

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

AD-A086 996/6 PC **A04**/MF **A01**
Naval Research Lab Washington DC
NRL Research in Support of the DOE Charged-Particle Inertial-Confinement-Fusion Program for FY 77-78.
Final rept.,
D. Mosher, G. Cooperstein, Shyke A. Goldstein, D. P. Bacon, and D. G. Colombant. 27 Jun 80, 68p NRL-MR-4237, AD-E000 483

Contents: Introduction to the Research Program; Paravector-Potential Diode Research; Electron Transport Experiments; Reflexive Focusing; MHD Response of Transport Channels; and Supporting Publications and Reports.

INIS-mf-4214 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Technology Problems of a Theta-Pinch Liner Reactor.
G. A. Baranov, V. A. Glukhikh, and G. A. Grad. 1975, 35p CONF-7509208-
In Russian.Joint Soviet-American seminar on pulsed thermonuclear reactors, Leningrad, USSR, 23 Sep 1975.
U.S. Sales Only. Microfiche copies only.

The main units of a fusion reactor based on the theta-pinch liner principle: the reactor chamber, the liner-reproduction system, the power supply, the plasma injector, the blanket, and the energy conversion system are presented. The parameters of the reactor of the least possible size and required energy have been determined: at the liner material density of 10 g/cm exp 3 and the pressure of liner acceleration forces of 6 x 10 exp 3 bar, it is necessary to have the storage energy of 1.7 GJ, electric energy of 14.0 GJ, and chamber radius of 1 m. The question of the choice of material for the liner has been discussed, but zinc, cadmium, and lead have been suggested as possible materials. The expected conditions in the chamber after reaction are described. As the result it has been established that the problems associated with the liner fabrication are the main technological problems of the whole trend of development of the power fusion reactors based on the theta pinch with a liner. (Atomindex citation 09:412967)

PATENT-4 190 016
Not available NTIS
Department of Energy, Washington, DC.
Cryogenic Target Formation Using Cold Gas Jets.
Patent,
C. D. Hendricks. Filed 13 Mar 79, patented 26 Feb 80, 8p PAT-APPL-6-020 121
Supersedes PAT-APPL-6-020 121.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus using cold gas jets for producing a substantially uniform layer of cryogenic materials on the inner surface of hollow spherical members having one or more layers, such as inertially imploded targets, are described. By vaporizing and quickly refreezing cryogenic materials contained within a hollow spherical member, a uniform layer of the materials is formed on an inner surface of the spherical member. Basically the method involves directing cold gas jets onto a spherical member having one or more layers or shells and containing the cryogenic material, such as a deuterium-tritium (DT) mixture, to freeze the contained material, momentarily heating the spherical member so as to vaporize the contained material, and quickly refreezing the thus vaporized material forming a uniform layer of cryogenic material on an inner surface of the spherical member. (ERA citation 05:030340)

PATENT-4 194 813
Not available NTIS
Department of Energy, Washington, DC.
Vacuum Aperture Isolator for Retroreflection from Laser-Irradiated Target.
Patent,
R. F. Benjamin, and K. B. Mitchell. Filed 13 Oct 78, patented 25 Mar 80, 4p PAT-APPL-951 203
Supersedes PAT-APPL-951 203-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The disclosure is directed to a vacuum aperture isolator for retroreflection of a laser-irradiated target. Within a vacuum chamber are disposed a beam focusing element, a disc having an aperture and a recollimating element. The edge of the focused beam impinges on the edge of the aperture to produce a plasma which refracts any retroreflected light from the laser's target. (ERA citation 05:031394)

18B. Isotopes

AD-A087 354/7 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda MD
Electron Linear Accelerator Production of Oxygen-15,
R. L. Weitz, and J. T. Casady. Dec 79, 9p Rept no. AFRRI-TN80-1

An electron linear accelerator was used to produce gaseous oxygen-15 by bremsstrahlung irradiation of hydrogen peroxide-water solutions. With helium as a sweep gas, it was possible to achieve oxygen-15 activities of 24 mCi per liter of gas. Carbon-11, the only detectable radioactive contaminant, constituted less than 0.2% of the activity when 30-MeV electrons were used. Transfer of oxygen-15 to blood by a simple bubbling technique resulted in blood activities of about 85 micro Ci/cc of blood. (Author)

NUREG/CR-0744 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Identification and Assessment of the Social Impacts of Transportation of Radioactive Materials in Urban Environments,
Christopher Cluett, M. Greene, F. Morris, W. Rankin, and C. Weiss. Jul 80, 199p SAND-79-7032
Also pub. as Battelle Human Affairs Research Centers, Seattle, WA. rept. no. B-HARC-411-049.

The study provides an assessment of the range of social impacts that have occurred or may result from the transportation of radioactive materials through urban environments. These impacts are identified by retrospectively examining representative cases and reviewing selections from the theoretical and the technical literatures on social impacts. The likelihood of social impacts occurring in the future is assessed on the basis of observed impacts to date. The study analyzes five categories of social impacts (psychological, sociological, political, legal, and organizational) resulting from four causative transportation events (incident free, vehicular accidents, human errors and deviations from accepted quality assurance practices, and malevolent acts). The methods of analysis include evaluations of public opinion surveys, selected literature reviews, analysis of selected case studies, interviews with knowledgeable officials and citizens, legal analyses, review of relevant informed professional judgement. This study concludes that political and legal impacts have been more substantial than psychological and sociological impacts, and for a given magnitude of physical consequences, radioactive materials transportation has greater social impacts than hazardous materials transportation generally. Malevolent acts, among the four causative event categories, appear to hold the greatest potential for severe social impacts.

18C. Nuclear Explosions

AD-A087 316/6 PC **A04**/MF **A01**
System Planning Corp Arlington VA
The Local Environment Resulting from a Massive Nuclear Attack on Whiteman Air Force Base.
Final technical rept.,
Charles W. Hulburt, Cynthia A. Yutko, and Roger J. Sullivan. Apr 80, 52p Rept no. SPC-537
Contract DCPA01-78-C-0280

The study examines the potential blast and fallout damage that would be sustained by the 15 counties surrounding the Whiteman Air Force Base in Missouri following a nuclear attack against the associated Minuteman missile silos. The study also provides recommendations concerning the shelters that would be required to protect the population of these 15 counties from blast effects and heavy fallout. The study was performed in consonance with the new emphasis that FEMA (Federal Emergency Management Agency) is giving to nuclear civil protection in counterforce areas. It is intended to be a prototype for analyses of areas containing other U.S. counterforce targets, notably the other five Minuteman wings, the Titan missiles, the Strategic Air Command bases, and the strategic submarine bases.

AD-A995 003/1 PC **A04**/MF **A01**
General Electric Co Santa Barbara CA TEMPO
Operation ARGUS. Report of the Commander, Task Force 88,
L. M. Mustin. 1 Oct 79, 59p DOE-WT-1665 (EX)
Contract DNA001-79-C-0455
Extracted version of report dated 29 Dec 59, AD-338 864L.

No abstract available.

AD-A995 009/8 PC **A02**/MF **A01**
General Electric Co Santa Barbara CA TEMPO
Operation BUSTER-JANGLE. Project 7.3 BUSTER and Project 7.1 JANGLE. Radiochemical, Chemical, and Physical Analysis of Atomic Bomb Debris.
Rept. for Oct-Nov 51,
W. Singlevich, and E. M. Douthett. 1 Oct 79, 16p DOE-WT-320 (EX)
Contract DNA001-79-C-0455
Extracted version of report dated 28 May 52, AD-370 328L.

No abstract available.

AD-A995 010/6 PC **A02**/MF **A01**
Department of Energy Washington DC

Operation TEAPOT. Irradiance Measurements with Time Resolution. Project 8.4f. Supplement.
Rept. for Feb-May 55,
W. B. Plum, R. J. Jenkins, and R. L. Hopton. 27 Feb 59, 14p Rept no. DOE-WT-1229
Supplement to Rept. no. DASA-WT-1150, AD-341 062L.

No abstract available.

SAND-79-1829 MF **A01**
Sandia Labs., Albuquerque, NM.
Initiation and Gas Expansion Model for the Light-Initiated Explosive Silver Acetylide-Silver Nitrate.
R. A. Benham. Feb 80, 44p
Contract EY-76-C-04-0789
Microfiche copies only.

Light-initiated high explosive, silver acetylide-silver nitrate (SASN), has been used to produce simulated X-ray blowoff impulse loading on reentry vehicles to study the system structural response. A model of the explosion process is required for estimating the average pressure profile delivered to the surface during the loading. A simplified model of the initiation and gas expansion process of the explosion is described. Observations from several experiments in which thin metallic flyer plates were accelerated with SASN were used to develop the model. Predictions of the approximate average pressure-time loading on the surface of a test structure is now possible. The pressure-time model can also be used to predict the motion of explosively driven thin solid flyer plates. (ERA citation 05:026289)

18D. Nuclear Instrumentation

AD-A087 229/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Detection of Protons in CR-39 Plastic Track Detector.
Environmental research papers,
Y. V. Rao, A. Davis, R. C. Filz, P. J. McNulty, and D. Shirkey. 11 Dec 79, 11p Rept nos. AFGL-TR-79-0297, AFGL-ERP-688

CR-39 plastic is used as a detector to observe monoenergetic protons. Several samples of CR-39 were exposed to protons of energies 1.5 MeV, 2.2 MeV, 3.2 MeV and 4.3 MeV. After etching measurements were carried out on track diameters produced by protons in all samples. The diameter distributions clearly show an excellent energy resolution of protons of different energies. From our preliminary analysis of data, it appears that the response function for registering protons in CR-39 may be a lot less complicated than in cellulose nitrate. (Author)

LBL-10039 PC **A08**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Limited-Angle Imaging in Positron Cameras: Theory and Practice.
K. C. Tam. Oct 79, 164p
Contract W-7405-ENG-48

The principles of operation of planar positron camera systems made up of multiwire proportional chambers as detectors and electromagnetic delay lines for coordinate readout are discussed. Gamma converters are coupled to the wire chambers to increase detection efficiency and improve spatial resolution. The conversion efficiencies of these converters are calculated and the results compare favorably to the experimentally measured values. (ERA citation 05:026259)

LBL-10822 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Apparatus to Detect Stable Fractional Charges on Matter.
R. Vanderspek. Apr 80, 23p
Contract W-7405-ENG-48

The construction of an apparatus designed to detect stable fractional charges on matter, if they exist, to the level of 10 exp -24 per nucleon is reported and discussed. The charges on a stream of highly consistent droplets produced by the apparatus are determined by accurate measurement of the deflection of the droplets in falling through a static electric field. Maintenance of certain parameters of operation calculated to limit the random effects of electrical and aerodynamical disturbances on the droplets indicate a precision in the measurement of the charge on a droplet of 0.02e can be attained. 7 figures. (ERA citation 05:026265)

PB80-205966 Not available NTIS
National Bureau of Standards, Washington, DC.
Pinhole Camera Imaging of Neutrons Using a Position-Sensitive Proportional Counter.
Final rept.,
J. W. Behrens, R. G. Johnson, and C. D. Bowman. 1980, 2p
Pub in. Transactions of the American Nuclear Society 34, p663-664 1980.

The authors describe progress at NBS in imaging eV neutrons produced by a spatially extended source using a position-sensitive proportional counter in a pinhole camera configuration. This work is being conducted (1) for a better understanding of the eV neutron source characterization from the neutron-producing target at the NBS linac, (2) for the development of resonance neutron radiography, and (3) for possible use in imaging high energy neutron sources.

UCRL-84109 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Design and Implementation of a Fiber-Optic gamma-Measurement System.
R. P. Reedy, D. W. Crawford, and F. Roeske, Jr. 19 May 80, 10p CONF-800719-1
Contract W-7405-ENG-48
International symposium of the Society of Photo-Optical Instrumentation Engineers, San Diego, CA, USA, 28 Jul 1980.

The design and implementation of the downhole portion of a measuring system for gamma rays is presented. Included are three alternative designs for radiation-resistant collimating and condensing lenses, sample cells, turning mirrors, and fiber-optic termination techniques. Also discussed are mechanical mounts and positioners, shielding, alignment, test methods, and field installation. Some general design suggestions for optical systems in adverse environments are also presented. (ERA citation 05:026260)

18E. Nuclear Power Plants

NUREG-0675-SUP-10 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Diablo Canyon Nuclear Power Station, Units 1 and 2, Pacific Gas and Electric Company, Supplement No. 10. Docket Nos. 50-275 and 50-323.
Safety evaluation rept.
Aug 80, 92p
See also NUREG-0675-SUP-9.

Supplement No. 10 to the Safety Evaluation Report for Pacific Gas and Electric Company's application for licenses to operate the Diablo Canyon Nuclear Power Station (Docket Nos. 50-275 and 50-323) located in San Luis Obispo County, California has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this Supplement is to discuss TMI-2-related requirements that must be met prior to fuel load of the Diablo Canyon facilities.

18F. Radiation Shielding and Protection

NUREG/CR-1198-V-2 PC **A17**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Design Guidance and Evaluation Methodology for Fixed-Site Physical Protection Systems. Volume II. Component Selection Matrices and Effectiveness Test Questionnaires.
H. A. Bennett, and M. T. Olascoaga. Jul 80, 379p
SAND-79-2378/2

Design guidance products and a system performance evaluation methodology have been developed to aid the Nuclear Regulatory Commission in the implementation of new regulations designed to upgrade the physical protection of nuclear' fuel cycle facilities. The evaluation methodology which incorporates the design guidance products, provides a means of arriving at an overall measure of performance for each capability required in the regulations. To arrive at this measure of performance, first the scores associated with the responses to a series of equipment and procedure questionnaires are aggregated. The aggregation of scores then proceeds through successive levels of a hierarchical structure developed for each capability.

NUREG/CR-1378 PC **A04**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
Hardening Existing Strategic Special Nuclear Material Storage Facilities.
Interim technical rept. to Mar 79.
Jun 80, 65p

This report provides guidelines to aid NRC licensees in evaluating existing strategic special nuclear material storage facilities, discusses typical tools that could be employed to penetrate such facilities, and provides simple and cost effective hardening techniques. The report was developed to provide guidance in support of the Physical Protection Upgrade Rule, effective March 25, 1980.

NUREG-0509 PC **A07**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Bibliography of Technical Guidance for the Physical Protection Upgrade Rule Requirements for Fixed Sites,
L. J. Evans, Jr., and T. Allen. Jun 80, 132p

A bibliography of technical references covering physical security systems, components, and procedures was prepared to provide Nuclear Regulatory Commission licensees a listing of available documents that could be used by licensees to select systems, components, and procedures to meet the revised physical protection requirements of 10 CFR Part 73 (Physical Protection Upgrade Rule).

NUREG-0535 PC **A15**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Fuel Cycle and Material Safety.
Review and Assessment of Package Requirements (Yellowcake) and Emergency Response to Transportation Accidents.
Final rept.,
C. Vernon Hodge. Jul 80, 329p
Prepared in cooperation with Department of Transportation, Washington, DC.

Following the accidental spill of yellowcake in Colorado in September 1977, a U.S. Nuclear Regulatory Commission/U.S. Department of Transportation study group met to consider topics on yellowcake packaging and response to transportation accidents involving any radioactive material. The group concluded that in an accident the state and local government agencies are responsible for controlling the scene, that carriers are responsible for notifying authorities and isolating and cleaning up any spilled radioactive material, and that shippers are responsible for informing others of hazards of the cargo. The group recommended that these parties prepare plans for carrying out these responsibilities. The group also recommended transportation data gathering programs, but, based on cost effectiveness arguments, did not recommend additional package requirements for yellowcake shipments.

18G. Radioactive Wastes and Fission Products

NUREG/CR-1513 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Isotope Migration-Land Burial: Water Chemistry at Commercially Operated Low-Level Radioactive Waste Disposal Sites.
Quarterly progress rept. Jan-Mar 80,
K. S. Czyscinski, A. J. Weiss, C. Anderson, B. Nine, and S. Garber. Jul 80, 32p BNL-NUREG-51219
Contract DE-AC02-76CH00016
See also report for Oct-Dec 79, NUREG/CR-1325.

This report presents results for tritium analyses for soil cores taken at West Valley, NY, and Barnwell, SC. Tritium movement at West Valley appears to be diffusion controlled. The Barnwell core data suggests that coring has intersected a water flow path below the trench. An apparatus has been designed for flow through column K determinations and is described. Gel filtration experiments using spiked trench water from West Valley have been continued using a longer column than used in previous work. Increased resolution of DOC components has been observed.

NUREG/CR-1514 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Properties of Radioactive Wastes and Waste Containers.
Quarterly progress rept. Jan-Mar 80,
H. K. Manaktala, A. J. Weiss, J. W. Adams, P. R. Hayde, and L. W. Milian. Jul 80, 25p BNL-NUREG-51220
Contract DE-AC02-CH00016

This report presents first quarter 1980 progress in research on properties of radioactive wastes and waste containers at Brookhaven National Laboratory. Solidification experiments were performed with organic ion-exchange resins using Portland type II cement to investigate waste to binder ratios which results in monolithic waste forms. Experiments were conducted to establish appropriate waste/binder ratios within which simulated boric acid reactor waste may be incorporated into portland type III cement, to produce acceptable waste forms. A 'two-part' urea-formaldehyde process was used to solidify four simulated LWR waste streams, viz. ion-exchange bead resins, diatomaceous earth, sodium sulfate, and boric acid wastes.

PATENT-4 162 230
Not available NTIS
Department of Energy, Washington, DC.
Method for the Recovery of Actinide Elements from Nuclear Reactor Waste.
Patent,
E. P. Horwitz, W. H. Delphin, and G. W. Mason. Filed 28 Dec 77, patented 24 Jul 79, 10p PAT-APPL-865 346
Supersedes PAT-APPL-865 346-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process is described for partitioning and recovering actinide values from acidic waste solutions resulting from reprocessing of irradiated nuclear fuels by adding hydroxylammonium nitrate and hydrazine to the waste solution to adjust the valence of the neptunium and plutonium values in the solution to the +4 oxidation state, thus forming a feed solution and contacting the feed solution with an extractant of dihexoxyethyl phosphoric acid in an organic diluent whereby the actinide values, most of the rare earth values and some fission product values are taken up by the extractant. Separation is achieved by contacting the loaded extractant with two aqueous strip solutions, a nitric acid solution to selectively strip the americium, curium and rare earth values and an oxalate and oxalic acid or trimethylammonium hydrogen oxalate to selectively strip the neptunium, plutonium and fission product values. Uranium values remain in the extractant and may be recovered with a phosphoric acid strip. The neptunium and plutonium values are recovered from the oxalate by adding sufficient nitric acid to destroy the complexing ability of the oxalate, forming a second feed, and contacting the second feed with a second extractant of tricaprylmethylammonium nitrate in an inert diluent whereby the neptunium and plutonium values are selectively extracted. The values are recovered from the extractant with formic acid. (ERA citation 05:030287)

PATENT-4 174 293
Not available NTIS
Department of Energy, Washington, DC.
Process for Disposal of Aqueous Solutions Containing Radioactive Isotopes.
Patent,
P. Colombo, R. M. Neilson, Jr., and W. W. Becker. Filed 12 Oct 77, patented 13 Nov 79, 8p PAT-APPL-841 410
Supersedes PAT-APPL-841 410-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process for disposing of radioactive aqueous waste solution in which the waste solution is utilized as the water of hydration to hydrate densified powdered portland cement in a leakproof container is described. The waste solution is dispersed without mechanical inter-mixing in situ in the bulk cement. Thereafter the hydrated cement body is impregnated with a mixture of a monomer and polymerization catalyst to form polymer throughout the cement body. The entire process is carried out while the temperature of the components during the process is maintained at a temperature below 99 exp 0 C. The container containing the solid polymerimpregnated body is thereafter stored at a radioactive waste storage dump such as an underground storage dump. (ERA citation 05:030282)

PATENT-4 186 657
Not available NTIS
Department of Energy, Washington, DC.
Apparatus for Shearing Spent Nuclear Fuel Assemblies.
Patent,
B. S. Weil, and C. F. Metz, III. Filed 7 Dec 78, patented 5 Feb 80, 4p PAT-APPL-967 469
Supersedes PAT-APPL-967 469-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus are described for shearing spent nuclear fuel assemblies of the type comprising an array of fuel pins disposed within an outer metal shell or shroud. A spent fuel assembly is first compacted in a known manner and then incrementally sheared using fixed and movable shear blades having matched laterally projecting teeth which slidably intermesh to provide the desired shearing action. Incremental advancement of the fuel assembly after each shear cycle is limited to a distance corresponding to the lateral projection of the teeth to ensure fuel assembly breakup into small uniform segments which are amenable to remote chemical processing. (ERA citation 05:030252)

18H. Radioactivity

NUREG/CR-0720 PC **A05**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
LWR Pressure Vessel Irradiation Surveillance Dosimetry.
Quarterly progress rept. Oct-Dec 78,
G. L. Guthrie, and W. N. McElroy. Jul 80, 93p HEDL-TME-79-18
See also report for Jul-Sep 77, PB-291 193.

The report describes progress made in the Light Water Reactor Pressure Vessel Irradiation Surveillance Dosimetry Program during October-December 1978. The primary objective of the program is to prepare an updated and improved set of dosimetry, damage correlation, and associated reactor analysis ASTM Standards for LWR-PV irradiation surveillance program. Supporting this objective are a series of analytical and experimental validation and calibration studies in 'Standard, Reference, and Controlled Environment Benchmark Fields', reactor 'Test Regions', and operating power reactor 'Surveillance Positions.'

18I. Reactor Engineering and Operation

AD-A087 002/2 PC **A05**/MF **A01**
Naval Research Lab Washington DC
Piping Inelastic Fracture Mechanics Analysis.
Memorandum rept.,
C. I. Chang, M. Nakagaki, C. A. Griffis, and R. A. Masumura. 30 Jun 80, 91p NRL-MR-4259, NUREG-CR-1119, AD-E000 493
Contracts NRC-03-79-116, NRC-FIN-B6587

Available experimental data and the analytical methods for predicting rupture of LWR piping are assembled and assessed. The analytical techniques investigated can be catalogued into three major groups: structural response, semiempirical methods, and the J-controlled growth approach. A leak-before-break condition is also investigated. (Author)

AED-Conf-77-498-001 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Nuclear Fuel Accounting.
D. E. Aisch. 1977, 6p CONF-7709147-53
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

After a nuclear power plant has started commercial operation the actual nuclear fuel costs have to be demonstrated in the rate making procedure. For this purpose an accounting system has to be developed which comprises the following features: 1) All costs associated with nuclear fuel shall be correctly recorded; 2) it shall be sufficiently flexible to cover also deviations from proposed core loading patterns; 3) it shall be applicable to different fuel cycle schemes. (Atomindex citation 09:384040)

AED-Conf-77-498-019 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Role of Nuclear Power in the World.
E. I. Goodman. 1977, 12p CONF-7709147-55
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The role of nuclear energy in the world is discussed from the near term and long term. For the period through the mid 1980s sufficient nuclear capacity is considered critical to forestall serious shortages of oil and possible high prices leading to economic stagnation. Over the next 30-35 years it is estimated that world nuclear power will reach a capacity of approx. 3 million megawatts electrical when world electrical capacity will be about 8 million megawatts. With this nuclear capacity and if a annual growth rate of 5% is achieved for coal, oil and gas would remain at their present rate of consumption and would be increasingly reserved for specialized uses where substitution is not feasible. Caution is stressed, however, especially in using long term forecasts except for overall guidance and even in short term projections frequent updating and revision is recommended. The factors which have inhibited nuclear power growth are discussed including: 1) rapidly rising capital costs and financing problems, 2) rising and uncertain fuel cycle costs, 3) uncertainties in licensing and public acceptance. Despite the foregoing, nuclear power still retains an economic edge over fossil-fired units in substantial portions of the world. Assuming satisfactory solution of its major problems it is estimated that about 27-40% of the electrical capacity of developing countries will be nuclear by the year 2000. This nuclear capacity will comprise approx. 20% of the world's total nuclear power capacity around the turn of the century. (Atomindex citation 09:384047)

AED-Conf-77-498-040 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Turnkey Contracts.
G. Langetepe. 1977, 8p CONF-7709147-25
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

To make energy available economically and in sufficient quantity is a main point for the future of an industrial and more for a developing country. The investment costs and the availability of a power plant and in particular for a nuclear power plant are the most significant factors in the economic operation of the plant. In the phase before signing the contract the essential decisions are made with high influence in the economic operation and the availability of the plant. A turn-key contract offers good possibilities to minimize the risks referring a) the plant quality and functionality, b) the plant investment cost, c) the plant completion date, d) the handling of the licensing procedures, e) the availability of the operation. The lecture mentions the points which are of high influence for a successful erection and operation period and which must be clarified before signing the contract between the buyer and supplier of the plant. (Atomindex citation 09:383477)

AED-Conf-77-498-044 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Export Financing of Nuclear Power Plants - Banks Experience.
1977, 9p CONF-7709147-26
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The lecture discussed the following: 1) Dimension and volume of the export financing of a nuclear power plant: 1.1) export orders of a new dimension; 1.2) individual loans occurring in connection with the export of a nuclear power plant: a) financial loans for maturities falling due under the export portion of the project; b) financial loans for the settlement of down- and interim payments to be made in connection with the export portion of the project; c) financial loans for the payment of local costs; d) loans for the financing of fuel elements; 2) governmental export insurance; 3) export financing in the individual industrial countries: USA, France, Great Britain, Japan (EXIMBANK), FRG. (Atomindex citation 09:383479)

AED-Conf-78-004-007 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Reactor Safety in the Public Discussion.
W. Rieger. 1978, 14p CONF-780149-9
In German.Meeting on the safety of the light-water reactor, Mainz, F.R. Germany, 16 Jan 1978.
U.S. Sales Only.

In the author's opinion, the discussion between experts and laymen, i.e. between technicians and scientists, on the one hand, and citizens or scientists who have become critical, on the other, is becoming so difficult 'because of the general uncertainty and fear of the atomic age determine attitudes and approaches'. According to the author, the consequence for future discussions on safety should be better utilization of the possibilities existing on the different levels. It is a matter of 'rendering the progress of the highly technical discourse based on experience, intelligible to everyone.' According to the author, everyone who takes part in the public discussion should make his own particular contribution. The expert should give his knowledge, the politician should expound the criteria for his decision, the citizen should state his reservations and worries. Only when people measure themselves against each other and when questions are really answered, will the way be paved for meaningful nuclear power politics. It must not become a blind rambling in a dangerous future. (Atomindex citation 09:386301)

INIS-mf-4606 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Federal Act of 29 April 1964 on Liability for Nuclear Damage (Atomic Liability Act).
25p
U.S. Sales Only.

Under this Act, the operator of a nuclear installation is liable for any nuclear incident occurring in such installation or which is caused by nuclear substances in his charge. If an incident is caused by a radioisotope, the person in possession of the radioisotope at the time of the incident is liable therefore. When an incident occurs during transport of nuclear substances, the carrier is liable in three cases only: when such substances are neither despatched to nor originating from installations on Austrian territory; when they are despatched without the written consent of the Austrian operator who is to receive them; and when they are not destined for a nuclear installation. Other provisions of the Act fix liability ceilings, a basis for apportionment of compensation when several victims are involved and the amount of security for coverage of the operators liability. The Act came into force on 1 September 1964. (Atomindex citation 10:421658)

NUREG/CR-0453 PC **A99**/MF **A01**
Los Alamos Scientific Lab., NM.
SIMMER-II: A Computer Program for LMFBR Disrupted Core Analysis.
Manual,
LaRon L. Smith, and Nancy N. Sheheen. Jun 80, 669p LA-7515-M
Contract W-7405-eng-36

Physical models, numerical methods, and program description are presented for SIMMER-II, a computer program to predict the neutronic and fluid-dynamic behavior of an LMFBR during a hypothetical core-disruptive accident. Either the time-dependent multigroup neutron diffusion or neutron transport equation is solved by the quasistatic method to predict reactor neutronic behavior during the accident. Cross sections depend on temperature and background cross sections. The structure, liquid, and vapor fields are modeled to predict the fluid-dynamic behavior of the reactor. Each field consists of density components to follow the material motion and energy components to predict the material temperatures. For typical accident calculations, the materials are fertile fuel, fissile fuel, stainless steel, sodium, control material, and fission gas. Heat, mass, and momentum transfer are calculated among the three fields and their components.

NUREG/CR-1184 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Evaluation of Simulator Adequacy for the Radiation Qualification of Safety-Related Equipment,
Lloyd L. Bonzon, and William H. Buckalew. May 80, 185p SAND-79-1787

Radiation qualification will be addressed in this report in order to evaluate the the adequacy of radiation simulators typically used in qualification test simulations. Where possible, discussion of combined environment effects will be made. 'Adequacy' need not be based on one-to-one correspondence of the actual radiation signature with a simulator signature, although that would be sufficient to assure adequacy. Instead, adequacy is to be judged on the basis of equivalence of equipment 'damage' as a result of the exposure; under that definition of adequacy, the radiation signatures may not be identical but the damage (and damage mechanisms) must be quite similar.

NUREG/CR-1355 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
CONAN: An LMFBR Containment Response Computer Code,
R. D. Gasser. Jul 80, 56p BNL-NUREG-51151
Contract DE-AC02-76CH00016

A description is given for the mathematical models used in the CONAN containment analysis code. The code was designed to study the particular phenomena which are important and limiting in the response of a LMFBR containment system to a hypothetical core melt-through accident. Results obtained using the CONAN code are compared to the exact solution for an adiabatic system and to results obtained from the CACECO containment code. The conclusion drawn from results obtained with CONAN is that the processes of evaporation and condensation, which are not treated mechanistically in the CACECO code, do have a significant effect on the transient and tend to strongly limit the severity of the accident in terms of containment pressurization.

NUREG/CR-1357 PC **A09**/MF **A01**
Brookhaven National Lab., Upton, NY.
Heat Removal Characteristics of Volume Heated Boiling Pools with Inclined Boundaries,
G. Alanson Greene, Owen C. Jones, Jr., Carl E. Schwarz, and Nesim Abuaf. Jul 80, 183p BNL-NUREG-51157
Contract DE-AC02-76CH00016

The heat transfer characteristics of volume-heated boiling pools are of importance in the safety analysis of hypothetical core disruptive accidents (HCDA) in liquid metal fast breeder reactors (LMFBR). In general, these pools would be composed of molten fuel and steel and would generate heat as a result of fission product decay. The fluid dynamic characteristics, as well as the containability of such boiling systems, would depend intimately on the heat loads applied to the surrounding boundaries. In addition, the thermodynamic and hydrodynamic states of the boiling mixture might determine the initial or boundary conditions for separate but related phenomena, such as nuclear recriticality, structural integrity, flow and freezing of multiphase fluids, etc. This report presents new experimental data for local boundary heat transfer coefficients and average void fraction in volume-boiling pools and compares these results to previous experimental data, and to existing empirical models.

NUREG/CR-1373 PC **A03**/MF **A01**
Creare, Inc., Hanover, NH.
First Quarter FY80 Progress Report on Refill Effects Program.
Quarterly progress rept. 1 Oct-31 Dec 79,
Christopher J. Crowley, and Richard G. Sam. Jul 80, 32p CREARE-TN-316
Contract NRC-04-75-162
See also report for FY79, NUREG/CR-0719.

The report describes work on the Creare Refill Effects Program during the first quarter of FY80. Calculations using a preliminary, semi-empirical analysis are compared against flashing transient data for the effects of wall heat transfer, break flow, downcomer slip, and non-equilibrium downcomer behavior. Results of parametric tests of flashing effects are briefly summarized for the effects of hot leg breaks, separator vessel pressure, initial plenum volume, annulus gap size, initial plenum liquid subcooling, and reverse core steam flow.

NUREG/CR-1403 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Water Reactor Safety Research Division.
Quarterly progress rept. 1 Oct-31 Dec 79,
Anthony J. Romano, D. J. Diamond, W. G. Shier, Jr., O. C. Jones, Jr., and D. van Rooyen. Jul 80, 52p BNL-NUREG-51178
Contract DE-AC02-76CH00016

The Water Reactor Safety Research Programs Quarterly Report describes current activities and technical progress in the programs at Brookhaven National Laboratory sponsored by the USNRC Division of Reactor Safety Research. The projects reported each quarter are the following: LWR Thermal Hydraulic Development, Advanced Code Evaluation, TRAC Code Assessment, and Stress Corrosion Cracking of PWR Steam Generator Tubing.

NUREG/CR-1488 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
An Ultrasonic Thermometry System for Measuring Very High Temperatures in Reactor Safety Experiments.
Gary A. Carlson, William H. Sullivan, Howard G. Plein, and Thomas M. Kerley. Jul 80, 84p SAND-79-0621
Contract DE-AC04-76DP00789

Ultrasonic thermometry has many potential applications in reactor safety experiments, where extremely high temperatures and lack of visual

access may preclude the use of conventional diagnostics. This report details ultrasonic thermometry requirements for one such experiment, the molten fuel pool experiment. Sensors, transducers, and signal processing electronics are described in detail. Axial heat transfer in the sensors is modelled and found acceptably small. Measurement errors, calculations of their effect, and ways to minimize them are given. A rotating sensor concept is discussed which holds promise of alleviating sticking problems at high temperature. Applications of ultrasonic thermometry to three in-core experiments are described.

NUREG/CR-1538 PC **E04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
PBF/LOFT (Power Burst Facility/Loss-of-Fluid Test) Lead Rod Test Series Test Results Report,
Dominic J. Varacalle, Jr., Richard W. Garner, Shu Shiozawa, Walter E. Driskell, and Dennis R. Evans. Jul 80, 108p EGG-2047
Contract DE-AC07-76ID1570

Results of the Power Burst Facility/Loss-of-Fluid Test (PBF/LOFT) Lead Rod sequential blowdown test series conducted in the PBF are presented. The tests were performed to evaluate the extent of mechanical deformation that would be expected to occur to low pressure (0.1 MPa) light water reactor design fuel rods when subjected to a series of large, double-ended cold leg break loss-of-coolant accident (LOCA) tests, and to determine whether subjecting these deformed fuel rods to subsequent testing would result in rod failure. The extent of mechanical deformation (buckling, collapse, or waisting of the cladding) was evaluated by comparison of cladding temperature and pressure measurements with out-of-pile experiment data, by comparison of steady state fuel centerline temperature response, and by posttest visual examinations and cladding diametral measurements.

NUREG/CR-1562 PC **A16**/MF **A01**
California Univ., Los Angeles. Dept. of Chemical, Nuclear, and Thermal Engineering.
Steam Chugging in Pressure Suppression Containment.
Final rept. 1 Jul 76-31 Jul 79,
C. K. B. Lee, and C. K. Chan. Jul 80, 355p
Contract AT(48-24)-0342

The condensation-induced hydrodynamic loads during low flow vapor injection (steam chugging) is studied. Qualitative visual experiments in a small scale single vent system indicate that the interfacial motion admits certain characteristic patterns in various ranges of pool temperatures and steam mass fluxes. Systematic classification of these characteristic patterns based on these two parameters resulted in a condensation regime map. Steam chugging occurs at the low mass flux (below 75 Kg/square meter-sec) and low pool temperature (below 80C) region of the map. Three different modes of chugging are identified: the internal chug where all condensation takes place in the vent; the detached bubble chug where the bubble is detached from the vent during formation; and the encapsulating bubble chug where the bubble grows to encapsulate the vent exit following formation.

NUREG/CR-1564 PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
Comparison of CONTEMPT-LT Containment Code Calculations with Marviken, LOFT, and Battelle-Frankfurt Blowdown Tests.
Technical rept.,
Gordon J. E. Willcutt, Jr., and Richard G. Gido. Jul 80, 95p LA-8423-MS

The study compared the CONTEMPT-LT/026 containment analysis code calculations with large-scale test results. LASL reviewed 7 large-scale experimental test programs and selected 5 of the 16 Marviken tests for pressure-suppression containment analysis comparisons and 1 LOFT test as a secondary investigation. In addition, 1 Marviken test was used to investigate the effects of 18 code parameter variations. A single Battelle-Frankfurt test was used for a dry containment comparison.

NUREG-0053-SUP-11 PC **A07**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of North Anna Power Station, Unit 2, Virginia Electric Power Company, Supplement No. 11. Docket No. 50-339.
Safety evaluation rept. Apr-Aug 80.
Aug 80, 130p

On June 4, 1976, the Nuclear Regulatory Commission issued its Safety Evaluation regarding the application for licenses to operate the North Anna Power Station, Units 1 and 2. The application was filed by Virginia Electric and Power Company. Supplements 1 through 9 documented the resolution of several outstanding items. Supplement No. 10 addresses the requirements for fuel loading and conducting low power testing of North Anna Unit 2. This supplement, No. 11 addresses the requirements which must be completed prior to the issuance of a full power operating license for Unit 2.

NUREG-0661 PC **A12**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Mark I Containment Long-Term Program Safety Evaluation Report, Resolution of Generic Technical Activity A-7.
Rept. for Feb 77-Dec 79.
Jul 80, 252p

During testing for an advanced Boiling Water Reactor (BWR) containment system design (Mark III), suppression pool hydrodynamic loads were identified which had not been considered in the original design of the Mark I containment system. To address this issue, a Mark I Owners Group was formed and the assessment was divided into a short-term and long-term program. The results of the NRC staff's review of the Mark I Containment Short Term Program are described in NUREG-0408. This report describes the results of the NRC staff's review of the generic Mark I Containment Long Term Program (LTP). The LTP was conducted to provide a generic basis to define suppression pool hydrodynamic loads and the related structural acceptance criteria, such that a comprehensive reassessment of each Mark I containment system would be performed. A series of experimental and analytical programs were conducted by the Mark I Owners Group to provide the necessary bases for the generic load definition and structural assessment techniques. The generic methods proposed by the Mark I Owners Group, as modified by the NRC staff's requirements, will be used to perform plant-unique analyses, which will identify the plant modifications, if any, that will be needed to restore the originally intended margin of safety in the Mark I containment designs.

NUREG-0699 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Advisory Committee on Reactor Safeguards.
Comments on the NRC Safety Research Program Budget for Fiscal Year 1982.
Jul 80, 50p

Recommendations of the Advisory Committee on Reactor Safeguards are presented to the Commissioners for their consideration for FY 82 budget for the NRC safety research program.

18J. Reactor Materials

NUREG/CR-0330-V-2 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Ex-Reactor Determination of Thermal Gap Conductance between Uranium Dioxide and Zircaloy-4. Stage II: High Gas Pressure.
Technical rept.,
John Garnier, and Stefan Begej. Jul 80, 75p PNL-3232
See also Volume 1, NUREG/CR-0330.

An ex-reactor study of the thermal gap conductance between Uranium Dioxide and Zircaloy-4 was performed under varying conditions of gas pressure (0.1 to 7 MPa); temperature (to 763 K); gas composition (Helium, Argon, He:Ar & He:Xe) and separation distance (to 23 micrometer). A description of the high pressure autoclave, specimen holder and associated apparatus is given. Experimental results are plotted and tabulated. An assessment of errors is made. This report concentrates on high gas pressures. An earlier report (NUREG/CR-0330; April 1979) provided data at low gas pressure. Results show that gap conductance increases rapidly with increasing gas pressure (i.e., gas density) over the range between 0.1 and 1 MPa.

NUREG/CR-1356 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
High Cycle Fatigue Behavior of Incoloy 800H in a Simulated High-Temperature Gas-Cooled Reactor Helium Environment,
P. Soo, R. L. Sabatini, L. G. Epel, and J. R. Hare, Sr. Jul 80, 87p BNL-NUREG-51156
Contract DE-AC02-76CH00016

The current study was an attempt to evaluate the high cycle fatigue strength of Incoloy 800H in a High-Temperature Gas-Cooled Reactor helium environment containing significant quantities of moisture. As-heat-treated and thermally-aged materials were tested to determine the effects of long term corrosion in the helium test gas. Results from inhelium tests were compared to those from a standard air environment.

NUREG/CR-1380-V-1 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Current Onsite Inspection Techniques for Light-Water Reactor Fuel Systems. Volume 1. Executive Summary,
W. J. Bailey, C. J. Morris, F. R. Reich, and K. L. Swinth. Jul 80, 43p PNL-3325

Onsite inspection techniques currently used on fuel systems at domestic commercial light water reactors were assessed. Those techniques are visual, gamma scanning, sipping, mensural, eddy current, and ultrasonic inspections. The assessment involved a literature survey, meetings with all five reactor fuel suppliers, and visits to three reactor sites.

NUREG/CR-1408 PC **A04**/MF **A01**
Argonne National Lab., IL.
Instrumented Impact Properties of Zircaloy-Oxygen and Zircaloy-Hydrogen Alloys,
A. M. Garde, and T. F. Kassner. Jul 80, 62p ANL-80-14

The report summarizes results of instrumented impact tests on subsize Charpy specimens of Zircaloy-oxygen and Zircaloy-hydrogen alloys. These results can be used with other property data to determine the response of reactor fuel assemblies to mechanical loads during the latter stages of hypothetical LOCA transients and seismic conditions. Mathematical analyses are used to evaluate the dynamic response of reactor fuel assemblies subjected to LOCA and seismic loads. Failure boundaries have been established for thermal shock as well as for impact and compressive loads at low temperatures.

NUREG/CR-1601 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Critical Experiments, Measurements, and Analyses to Establish a Crack-Arrest Methodology for Nuclear-Pressure-Vessel Steels.
Progress rept. Jan-Mar 80,
A. R. Rosenfield, I. Abou-Sayed, M. F. Kanninen, J. Jung, and C. W. Marschall. Jul 80, 45p BMI-2055
See also report for Jun-Dec 79, NUREG/CR-1555.

Analyses have been performed on ORNL Thermal-Shock Experiment TSE-5 using a modified elastic dynamic finite-difference-solution procedure. These used two different postulated dynamic-fracture-toughness relations. In both cases, the dynamic analysis predicted that crack arrest would occur well beyond the point suggested by a quasistatic analysis. Crack-initiation studies on the steel used in TSE-5 revealed a large degree of scatter in K sub IC. A statistical method was used to estimate lower-bound toughness based on the three-parameter Weibul distribution. Preliminary fractographic examination indicates that the fracture origin can be located and that this technique may be used to elucidate the source of the scatter.

NUREG-0703 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Safeguards.

Potential Threat to Licensed Nuclear Activities from Insiders (Insider Study).
Technical rept.,
Sarah A. Mullen, John J. Davidson, and Harvey B. Jones, Jr. Jul 80, 200p

The Insider Study was undertaken by NRC staff at the request of the Commission. Its objectives were to: (1) determine the characteristics of potential insider adversaries to licensed nuclear activities; (2) examine security system vulnerabilities to insider adversaries; and (3) assess the effectiveness of techniques used to detect or prevent insider malevolence. The study analyzes insider characteristics as revealed in incidents of theft or sabotage that occurred in the nuclear industry, analogous industries, government agencies, and the military. Adversary characteristics are grouped into four categories: position-related, behavioral, resource and operational. It also analyzes (1) the five security vulnerabilities that most frequently accounted for the success of the insider crimes in the data base; (2) the 11 means by which insider crimes were most often detected; and (3) four major and six lesser methods aimed at preventing insider malevolence. In addition to case history information, the study contains data derived from non-NRC studies and from interviews with over 100 security experts in industry, government (federal and state), and law enforcement.

PAT-APPL-6-070 365 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Device for Fracturing Silicon-Carbide Coatings on Nuclear-Fuel Particles.
Patent Application,
L. J. Turner, M. G. Willey, S. M. Tiegs, and J. E. Van Cleve, Jr. Filed 28 Aug 79, 16p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention is a device for fracturing particles. It is designed especially for use in hot cells designed for the handling of radioactive materials. In a typical application, the device is used to fracture a hard silicon-carbide coating present on carbon-matrix microspheres containing nuclear-fuel materials, such as uranium or thorium compounds. To promote remote control and facilitate maintenance, the particle breaker is pneumatically operated and contains no moving parts. It includes means for serially entraining the entrained particles on an anvil housed in a leak-tight chamber. The flow rate of the gas is at a value effecting fracture of the particles; preferably, it is at a value fracturing them into product particulates of fluidizable size. The chamber is provided with an outlet passage whose cross-sectional area decreases in the direction away from the chamber. The outlet is connected tangentially to a vertically oriented vortex-flow separator for recovering the product particulates entrained in the gas outflow from the chamber. The invention can be used on a batch or continuous basis to fracture the silicon-carbide coatings on virtually all of the particles fed thereto. (ERA citation 05:030239)

PATENT-4 162 231 Not available NTIS
Department of Energy, Washington, DC.
Method for Recovering Palladium and Technetium Values from Nuclear Fuel Reprocessing Waste Solutions.
Patent,
E. P. Horwitz, and W. H. Delphin. Filed 28 Dec 77, patented 24 Jul 79, 4p PAT-APPL-865 347
Supersedes PAT-APPL-865 347-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is described for recovering palladium and technetium values from nuclear fuel reprocessing waste solutions containing these and other values by contacting the waste solution with an extractant of tricaprylmethylammonium nitrate in an inert hydrocarbon diluent which extracts the palladium and technetium values from the waste solution. The palladium and technetium values are recovered from the extractant and from any other coextracted values with a strong nitric acid strip solution. (ERA citation 05:030285)

18K. Reactor Physics

NUREG/CR-1439 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
A One-Dimensional Neutron Kinetics Model for the THOR (Thermohydraulic of Reactors) Code.
Final rept.,
R. D. Lawrence, and R. T. Chiang. Jul 80, 39p
BNL-NUREG-51187
Contract DE-AC02-76CH00016
Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Nuclear Engineering Program.

The THOR (Thermohydraulic Of Reactors) computer code is designed as a fast-running 'best estimate' computer program to predict normal and hypothetical accident-induced, thermohydraulic transients in light-water cooled reactor systems. The purpose of this report is to describe the neutron kinetics model which has been developed for incorporation into the THOR code. The kinetics model calculates the energy deposition in the reactor core due to fission and radioactive decay. This calculation is performed using one of three user-selected options: (1) Table lookup of total power as a function of time, (2) point kinetics, or (3) 1-group, 1-dimensional (axial) space-dependent kinetics. Feedback effects due to changes in fuel temperature, coolant density are included in both the point and space-dependent options. The space-dependent option also includes the capability to calculate the initial critical axial power distribution, and to represent explicitly the movement of control rods in and out of the core.

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A086 944/6 PC **A06**/MF **A01**
Environmental Research Inst of Michigan Ann Arbor
Identification and Screening of Remote Mine Detection Techniques.
Technical rept.,
Y. Morita, G. Suits, H. F. McKenney, and I. J. Sattinger. Jun 79, 103p Rept no. ERIM-138300-22-T
Contract DAAK70-78-C-0198

This report documents the technical effort and results achieved for the task of identification and screening of promising remote sensing systems and other methods of detecting and identifying mines, minefields, minelaying equipment or minelaying operations and recommends continuing effort on the most promising methods. Systems considered under this task include systems presently in use, systems on which research and development is currently being conducted, and systems with potential for future development. Emphasis in the study was placed on detecting surface-laid minefields in the European theater with short detection reaction times. Continued effort is recommended on aerial photography, with particular attention paid to rapid processing and delivery of imagery to the local commander. Field tests of the Spotlight radar, being conducted under another task of this project, may give quantitative information of its mine detection capability, on the basis of which further effort on this type of radar can be planned. Of the electro-optical scanners, the active scanner most nearly approaches a 24-hour data collection capability, with multispectral scanners and passive infrared scanners having more restricted capability.

AD-A087 238/2 PC **A04**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Indirect Fire Artillery Ground-Burst Simulator.
Final rept. Sep 77-Jun 78,
S. Lopatin, and R. Ames. Jul 80, 69p PMT-TR-0002, ARLCD-TR-79029, AD-E400 439

An exploratory development effort was conducted to design, fabricate, and test an experimental breadboard artillery ground burst simulator (AGBS) for use in two-sided tactical training exercises. The AGBS was successfully demonstrated during a REALTRAIN training exercise at Fort Carson, Colorado, 22 March 1978. (Author)

AD-A087 415/6 PC **A05**/MF **A01**
H S S Inc Bedford MA
High Resolution Spectra of HE Detonations.
Final rept. 1 Oct 78-14 Oct 79,
D. F. Hansen. 7 Jul 80, 90p HSS-B-060, AFTAC-TR-80-24
Contracts F08606-77-C-0024, MIPR-FY7625-77-00052

A feasibility test was performed using optical spectroscopy to quantify the elements present in a device having a high explosive detonation. Because the heat from the explosion was about 2500 K after a few milliseconds, only the lowest excitations were observed in the elements. The presence of Al, Ti, Mn and Fe was detected within the narrow bandwidths of the instruments. A spin-off experiment using special film suggested that shrapnel could be sized even while heated and burning in flight. (Author)

PATENT-4 172 408 Not available NTIS
Department of the Navy Washington DC
Liquid Propellant Gun, Breech Pressure Axial Injection.
Patent,
Steve Ayler, John Holtrop, and Bruce Bartels. Filed 29 Aug 77, patented 30 Oct 79, 8p AD-D007 392/4, PAT-APPL-828 562
Supersedes PAT-APPL-828 562-77, AD-D004 509.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A liquid propellant gun having a chamber adapted to receive a projectile and liquid propellant and having a breech area containing a fuel injection system and a valve internally thereof and a bolt which is chambered within said valve and adapted to move from a projectile load to a fire position. The movement of the bolt from projectile load to fire position is done in one movement and this is possible in that the valve is able to hold high-pressure, making unnecessary a forward jogging of the bolt before firing. (Author)

19B. Bombs

AD-A087 241/6 PC **A05**/MF **A01**
Southwest Research Inst San Antonio TX
Development of Safe Separation Criteria for the Manufacture of BLU Bomblets.
Final rept.,
F. E. Slater, E. P. Bergmann, R. M. Rindner, and W. O. Seals. Jun 80, 81p SWRI-02-5181-001, ARLCD-CR-80007, AD-E400 446
Contract DAAK10-78-C-0064

The purpose of this program is to obtain the safe separation criteria for in-plant activities involving bulk explosives and explosive-filled ordnance related to the manufacturing and assembly of BLU bomblets. The tests were carried out to simulate, as closely as possible, actual processing activities. They demonstrated that maintenance of specific separation distances can minimize property damage and reduce the probability of propagation resulting from a detonation. Test results indicated: (1) 27.3 kg cyclotol in cardboard containers require a safe separation of 5.5 m. If the cyclotol is in 3 mm thick 6061-T6 or 7075-T6 aluminum boxes, the safe separation distance is in excess of 8.2 m. If

the aluminum boxes are shielded with 9 mm of kevlar bonded to the containers, the safe separation is reduced to 7.3 m. (2) BLU-63 A/B hemispheres in pouring trays can be conveyed safely with the trays in intimate contact as long as the riser is limited to 2.0 kg of explosive. (3) Loose BLU-63 A/B hemispheres must be at least 13 mm apart. Complete bomblets must be separated 25 mm to be safe.

19C. Combat Vehicles

AD-A086 956/0 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Drawbar Pull.
Final rept. on test operations procedure.
18 Jul 80, 11p Rept no. TOP-2-2-604
Supersedes report dated 19 Nov 75, AD-A027 202.

This report describes procedure for evaluating vehicle power available for acceleration, towing, or hill climbing and defines drawbar pull. Also included are procedures for hard-surface, soil, and water tests. Discusses vehicle preparation, instrumentation method of computing results, data reduction and presentation. It establishes curves for comparing performance with similar vehicles and for predicting gradeability. Applicable to wheeled, tracked, and amphibious vehicles. (Author)

AD-A086 957/8 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Steering.
Final rept. on test operations procedures.
18 Jul 80, 13p Rept no. TOP-2-2-609
Supersedes report dated 9 Jan 76, AD-A036 033.

Prescribes procedures for evaluating vehicle steering systems. Describes cramping angle and steering ratio measurement. Includes tests for turning, overall steering performance, lane changing, drift, dead engine steering, control on slopes, and adverse terrain, and human factors evaluation. Applicable to land steering of wheeled, tracked, and amphibious vehicles. (Author)

AD-A086 958/6 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Gradeability and Side-Slope Performance.
Final rept. on test operations procedure.
18 Jul 80, 9p Rept no. TOP-2-2-610
Supersedes report dated 21 Oct 76, AD-A031 702.

Describes procedures for evaluating vehicle gradeability and side-slope performance. Discusses payload, inspection, vehicle performance, safety, and instrumentation. Includes procedures for calculating the critical grade angle prior to testing and for evaluating brakes, engine, transmission, fuel system, and steering performance during testing. Applies to wheeled and tracked vehicles. (Author)

AD-A086 959/4 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Fording.
Final rept. on test operations procedure.
18 Jul 80, 18p Rept no. TOP-2-2-612
Supersedes report dated 26 Jul 73, AD-769 556.

Provides procedures for evaluation of wheeled and tracked vehicle fording ability and effectiveness of fording kits. Covers shallow water, deep water, underwater, and submerged fording. Describes test courses and equipment; preparation of vehicle and accessories; safety hazards; performance data including water ingress and egress capability, effects on vehicle operation on land, and endurance. Discusses emergency exit practices and corrosive effects of salt water and air. Limited to vehicles designed to negotiate a water obstacle with wheels or tracks in contact with the bottom. (Author)

AD-A086 960/2 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Braking - Tracked Vehicles.
Final rept. on test operations procedure.
18 Jul 80, 11p Rept no. TOP-2-2-627
Supersedes report dated 16 Nov 77, AD-A047 775.

This report describes a method of evaluating the brake systems of tracked vehicles. It covers: brake holding ability, stopping distance, steering brake performance, wet and freezing effects, braking potential, service brake efficiency, fade tests, brake system endurance, and human factors evaluation. It also includes test course and instrumentation requirements.

AD-A086 961/0 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Center of Gravity.
Final rept. on test operations procedure.
18 Jul 80, 11p Rept no. TOP-2-2-800
Supersedes report dated 16 Jul 74, AD-A016 154.

This report describes standard techniques for determining the center of gravity of heavy equipment including vehicles and large weapons. It covers suspension, reaction, and weighing methods and includes procedures for calculating the combined center of gravity of two or more masses when attached to each other and considered a single unit. It discusses error factors and factors to be considered in selecting the appropriate method. These techniques apply to wheeled and tracked vehicles, trailers, large weapons, construction equipment, and certain types of warehouse and shop equipment.

AD-A086 988/3 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Standard Obstacles.
Final rept. on Test operations procedure.
25 Jun 80, 11p Rept no. TOP-2-2-611
Supersedes Rept. no. TOP-2-2-611, AD-A029 316.

This report provides a method for evaluation of obstacle-negotiating capability. It describes procedures for bridging, wall climbing, trench crossing, frame twisting, and aircraft/landing-craft loading-ramp tests. It discusses obstacle courses to include a profile sketch of each but excludes slope, fording, washboard, and other standard obstacle tests covered in other TOP's. It is applicable to all military vehicles. It addresses obstacles in DARCOM Mobility Model.

AD-A086 989/1 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Automotive Safety and Health Hazard Evaluation.
Final rept. on test operations procedure.
11 Jan 80, 25p Rept no. TOP-2-2-508
Supersedes Rept. no. MTP-2-2-508, AD-718 729.

No abstract available.

19D. Explosions, Ballistics, and Armor

AD-A086 967/7 PC **A04**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
Use of a New Analytical Technique to Determine Heat Input from Inner Surface Temperatures Measured on a Hemispherical Shell during a Free Flight Experiment.
Technical rept.,
G. Jepps. Jan 79, 64p Rept no. WSRL-0069-TR

A free flight experiment has been conducted on a hemispherical shell to test a new technique for deriving outer surface temperature and heat transfer distributions from inner surface temperature measurements recorded from three arrays of thermocouples. The hemispherical shell which was mounted on the front of a rocket vehicle reached a maximum Mach number of 5.5 at 4 km altitude after 7 s of flight. Derived heat transfer profiles are characteristic of boundary layer flow which is laminar in the stagnation region, changing to turbulent within the first twenty degrees of arc. For the maximum heating profile, Stanton numbers varied between 0.0037 at 30 deg from the stagnation point and 0.0025 at 60 deg. The maximum free stream Reynolds number based on body diameter was 26 million. Agreement with laminar stagnation point heat transfer theory for steady flow is good except for just after maximum heating where the experimental results are some twenty five per cent higher. It is concluded that the new technique is successful but that the circumferential temperature and heat transfer resolutions could be improved by increasing the number of thermocouples in each array from seven to at least nine. (Author)

AD-A086 980/0 PC **A04**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Water Tunnel Simulation Study of the Later Stages of Water Entry of Conical Head Bodies. Phase II. Effect of the Afterbody on Steady State Ventilated Cavities.
Technical memo.,
D. R. Stinebring, and J. W. Holl. 3 Dec 79, 73p
Rept no. ARL/PSU/TM-79-206
Contract N00024-79-C-6043

This report documents the second phase of the water tunnel studies that are intended to simulate the cavity running phase of water entry. The primary purpose of the investigation was to study the effect of afterbody arrangement on steady state ventilated cavities. The models utilized were 1.0 inch diameter conical nosed bodies with a 45 deg. apex angle. Three models were tested: one having a 1.0 inch diameter afterbody, one having a 0.5 inch diameter afterbody and the third having no afterbody. The cavitation number as a function of cavity length and ventilation air flow coefficient as a function of cavitation number were measured for all models. The pressure distribution was found for a wide range of cavity lengths for the model with the 1.0 inch diameter afterbody. Data for the ventilation air flow coefficient and pressure distribution are in good agreement with previous studies of similar models. An interesting result is that the model requiring the lowest ventilation air flowrate for a given cavitation number was the model with no afterbody. For most of the flow states investigated, the model with the 0.5 inch diameter afterbody required the highest flowrate. The transition between the reentrant jet and twin vortex regimes was studied briefly. At transition, the cavity would grow four or five times its original length for a slight increase in ventilation air flowrate. A cavity attrition test was conducted to simulate the decay of a cavity behind a missile.

AD-A087 007/1 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Simulations of Gas Phase Detonations: Introduction of an Induction Parameter Model.
Memorandum rept.,
E. S. Oran, J. P. Boris, T. R. Young, Jr., M. Flanigan, and T. Burks. 25 Jun 80, 34p NRL-MR-4255, AD-E000 488

Detailed numerical simulations of supersonic reactive flow and gas phase detonation problems are very expensive due to their computer time and memory requirements. The bulk of this cost is in integrating the ordinary differential equations describing chemical reactions. A global induction parameter model has thus been developed which describes the chemical induction time of a mixture and allows for release of energy over a finite time period. The specific gases for which it has been calibrated are stoichiometric mixtures of hydrogen and methane in air. The relatively inexpensive induction parameter model is then used in time-dependent one- and two-dimensional simulations of supersonic reactive flows. (Author)

AD-A087 240/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Explosibility of Explosive and Propellant Dusts.
Final rept.,
W. T. Moore, P. Lu, S. Roorda, B. Fishburn, and N. Slagg. Jul 80, 43p ARLCD-TR-79045, AD-E400 449

A specially design flow system was constructed to obtain more detailed data on the effect of particle size and concentration on the spark ignition of propellant and explosive dusts. With this apparatus the concentration can be controlled over a 1.5 m (5 ft), and streak photography can be employed to determine the velocity of flames and/or explosion waves. Thus information on both ignition and propagation can be obtained. The ignition characteristics of M1 propellant, RDX, HMX, and ball powder were determined. The concentration was varied from 0.15 to 1.5 g/liter, and the particle size was from 75 to 225 micrometers. Ignition with subsequent flame propagation required a concentration of at least 0.15 to 0.3 g/liter for all dusts tested. Values from previous studies conducted in a Hartmann apparatus ranged from 0.1222 g/liter to 0.5 g/liter for some of the same materials with similar particle sizes. Thus the lower limits of ignition are in good agreement; however, due to the relatively small size of the Hartmann apparatus, direct comparisons of ignition at upper limits are difficult.

AD-A087 416/4 PC **A07**/MF **A01**
Kaman Sciences Corp Colorado Springs CO
K3. An Eulerian Finite Difference Program for Three-Dimensional Material Response.
Final rept. 9 Jul 79-28 Feb 80,
John May, P. Snow, David C. Williams, and W. Windholz. 28 Feb 80, 136p Rept no. K-80-226(R) Contract DASG60-79-C-0098

K3 is a computer code for simulation of target response to projectile impacts. It is a three-dimensional code derived from CSQII. Used to investigate impact lethality phenomena. A Lagrangian-Eulerian finite difference method is used featuring a rezoning technique with retention of void volumes. This manual provides the technical information required to understand the CSQII to K3 extension and details the inputs necessary for program execution, as well as providing example calculations. (Author)

19E. Fire Control and Bombing Systems

AD-A087 239/0 PC **A03**/MF **A01**
Analytic Sciences Corp Reading MA
A Plan for Developing and Validating a Gun System Design Trade-Off Methodology.
Final rept. Jun 79-Feb 80,
Charles F. Price, and Jang G. Lee. 15 Feb 80, 44p TASC-TR-1640-1, ARSCD-CR-80008, AD-E400 432
Contract DAAK10-79-C-0213

Procedures are described for validating a Helicopter Weapon Simulation Model (HWSSM) using data collected from Army's recent Air-to-Air Self Defense Test (AASDT), and for integrating the HWSSM with a gun system sizing model to compute system weight as a function of the basic performance parameters. These parameters include firing interval, probability-of-hit or probability-of-kill, the types of engagements, and the number of engagements of each type per mission. These procedures will provide the Army with an overall methodology for conducting airborne gun system design tradeoff studies. (Author)

19F. Guns

AD-A087 154/1 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Surface Crack K-Estimates and Fatigue Life Calculations in Cannon Tubes.
Technical rept.,
John H. Underwood, and J. F. Throop. 1979, 22p ARLCB-TR-80021, AD-E440 071
Availability: Pub. in Part-Through Crack Fatigue Life Prediction, A TM STP 687, p195-210 1979.

K solutions for internal surface cracks in pressurized cylinders are compared, including Smith's photoelastic results, Hussain's collocation and compliance results, and Underwood's estimates. Fatigue crack growth observation from cannon tubes are described, particularly in relation to surface crack growth and multiple cracks. A method is proposed for describing quantitatively the effect of residual stress on K in cylinders with shallow cracks. The combination of compressive residual stress with applied stress reduces K and thus increases fatigue life. (Author)

AD-A087 375/2 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Factors Influencing the Durability of Chrome Plate.
Technical rept.,
R. S. Montgomery, and F. K. Sautter. 15 Oct 79, 16p ARLCB-TR-80020, AD-E440 074
Pub.in Wear, V60 p141-148 1980. Presented at the International Conference on Wear of Materials, Dearborn, MI. Apr 79.

The bores of many cannon tubes are electroplated with chromium. This is done to provide better resistance to erosion and wear and in the case of naval guns to provide corrosion resistance as well. The resistance of chrome plate to erosion and wear is so good that there is little or no wear of the bore until the chromium begins to spall off the steel substrate. In the present research the effects of various factors on the durability of the plate were investigated using a geared roller test machine. It was found that the important stress is the shear stress in the plane normal to the direction of rolling rather than the maximum shear stress; this corresponds to the maximum shear strain. This results has application to the subcase fatigue or 'case crushing' failure of case-handed gears. The failure on repeated loading was found to be in the substrate steel immediately below the interface rather than at the interface itself. The durability of the plated surface decreased by about half as its thickness was increased from 0.1 5 to 0.41 mm although most or all of this can be attributed to the increased shear stress near the interface for the thicker electroplates. It was also found that residual compressive stress in the substrate steel had a great effect on durability; even the mild residual compressive stress introduced into the steel surface by sandblasting before plating increased durability many fold. Finally it was found that a bainite microstructure rather than the usual tempered martensite caused a significant decrease in durability.

19H. Underwater Ordnance

PATENT-4 189 026 Not available NTIS
Department of the Navy Washington DC
Underwater Generation of Low Frequency Sound.
Patent,
Myron A. Elliot, and Robert H. Forbus. Filed 13 Jun 54, patented 19 Feb 80, 6p AD-D007 388/2, PAT-APPL-403 947
Supersedes PAT-APPL-403 947-54.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for underwater generation of low frequency sound comprises a conically shaped explosion chamber open at both ends, a firing chamber having inlet and outlet passages at opposite ends thereof, ignition means in the firing chamber, a restricted orifice between the outlet passage of the firing chamber and the small open end of the explosion chamber, a mixing chamber opening into said inlet passage, and two supply lines for introducing gases to form a combustible mixture in the mixing chamber. The combined resistance the supply lines and the mixing chamber offer to the flow of gas in the upstream direction is slightly greater than the flow resistance of said restricted orifice. The arrangement is such that, when the gases in the firing chamber are ignited with the device submerged in water, the flame spreads downstream through the explosion chamber and also upstream into the supply lines, thereby extinguishing the flame. (Author)

20.
PHYSICS

20A. Acoustics

AD-A087 136/8 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Mathematical Sciences
Effect of a Class of Random Currents on Acoustic Transmission in an Ocean with Linear Sound Speed,
M. J. Jacobson, W. L. Siegmann, and B. K. Newhall. 5 Jul 79, 21p Rept no. RPI-MATH-127 Contract N00014-76-C-0288
Pub. in Jnl. of the Acoustical Society of America, v67 n6 p1997-2010 Jun 80.

No abstract available.

AD-A087 254/9 PC **A07**/MF **A01**
Texas Univ At Austin Applied Research Labs
User's Manual for NEMESIS and PLMODE.
Technical memo.,
Ruth Gonzalez, and Susan G. Payne. 1 May 80, 132p Rept no. ARL-TM-80-6
Contract N00014-79-C-0263

The normal mode model, NEMESIS, was designed and implemented at the Applied Research Laboratories, The University of Texas at Austin (ARL:UT), to aid in the investigation of low frequency, range invariant, acoustic propagation effects. The mathematical basis and numerical scheme of this model are described by Gonzalez and Hawker (1980). NEMESIS computes the eigenvalues and normal modes of the depth separated acoustic wave equation. Group velocities and modal attenuation terms are alos computed. Propagation loss and velocity potential for a source and receiver at a given range can be calculated from these quantities (Gonzalez and Hawker, 1980). A computer model, PLMODE, was designed to perform these computations, and the computer code for both NEMESIS and PLMODE was prepared for export to other research laboratories. This report is designed to accompany this software and to assist persons who wish to use it. The contents include descriptions of the modeled environment, the input data and their format, and the output produced by the models. An explanation of the diagnostic messages that may arise during execution of the models is also included. Estimates of memory requirements and execution times are given along with sample data sets and their resulting output.

PATENT-4 205 394 Not available NTIS
Department of the Navy Washington DC
Sealed Cavity Hydrophone Array Calibration.
Patent,
George O. Pickens. Filed 3 Nov 78, patented 27 May 80, 9p AD-D007 382/5, PAT-APPL-957 391
Supersedes PAT-APPL-957 391-78, AD-D005 525.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus and method for calibrating a hydrophone array comprising a plurality of electrically interconnected hydrophones over a range of acoustic signal frequencies having a lower limit on the order of 1 Hz. Apparatus includes a container having a sealed cavity for sealing the hydrophone array in a selected fluid, an electro-acoustic projector for projecting acoustic signals of frequencies selected from the frequency range into the sealed cavity, and a reference hydorphone contained within the sealed cavity for generating a reference

signal in response to each projected acoustic signal. Apparatus further includes monitoring equipment coupled to the reference hydrophone and to the hydrophone array for enabling a selected characteristic of one of the reference signals to be compared with the same characteristic of a signal generated by the hydrophone array when an acoustic signal is projected into the sealed cavity. (Author)

20B. Crystallography

AD-A086 991/7 PC **A08**/MF **A01**
New Univ of Ulster Coleraine (Northern Ireland) School of Physical Sciences
Growth and Application of Cadmium Telluride.
Final technical rept. Feb 77-Jan 80,
R. H. Williams, and M. H. Patterson. Jan 80, 171p
Grant DA-ERO-77-G-026

Large Single Crystals of CdTe were grown by the methods of Liquid Encapsulated Czochralski, Fast Vertical Bridgman, Travelling Heater Method, Stockbarger method. Electrical characterization was done by Seebeck, Hall Effect and Conductivity measurements. Surfaces were investigated using XPS, UPS, AES and LEED. Metal-CdTe contacts were fabricated. Formation of these was monitored using XPS, UPS, LEED, AES. Barrier Heights were established by I-V, C-V and UPS measurements. Results show that the effect of the CdTe surface on the type of contact formed is very marked. (Author)

20C. Electricity and Magnetism

AD-A086 909/9 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Effect of Surface Roughness on the Image Potential,
Talat S. Rahman, and Alexei A. Maradudin. 25 Jul 78, 19p AFOSR-TR-80-0527
Contract F49620-78-C-0019
Pub. in Physical Review B, v21 n2 p504-521, 15 Jan 80.

No abstract available.

AD-A087 157/4 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
New Method for Determining Temperature Coefficients of Bare Piezoelectrics,
Paul H. Carr, and Robert M. O'Connell. 1979, 5p Rept no. RADC/ETR-80-0020
Pub. in Ultrasonics Symposium Proceedings, IEEE Catalogo Number 79CH1482-9SU, 1979.

No abstract available.

AD-A087 200/2 MF **A01**
Technical Training Group (3395th) Keesler AFB MS
The Nature of Science: A Case Study of Electromagnetic Theory from Oersted to Hertz.
Final rept.,
Donald Ralph Baucom. 9 Jul 79, 40p
Availability: Microfiche copies only.

This paper is a case study of the development of a scientific theory, specifically, the development of electromagnetics in the 19th century. After a brief introduction that discusses the nature of science and technology and their interaction in modern research and development, an overview of the science of electricity and magnetism prior to 1800 is presented. Following this introduction, the study focuses on the contributions to the development of electromagnetic theory of four major scientists--Hans Christian Oersted, Michael Faraday, James Clerk Maxwell, and Heinrich Hertz. (Author)

20D. Fluid Mechanics

AD-A087 006/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Derivation of the Variable Coefficient Korteweg-de Vries Equation Using Multitiming Techniques.
Memorandum rept.,
Mark S. Cramer. 7 Jul 80, 19p NRL-MR-4222, AD-E000 489

The method of multiple scales or multitiming technique is used to derive the variable coefficient Korteweg de Vries (KdV) equation. Three small and independent parameters are introduced, epsilon which gives a measure of the amplitude of the wave, micrometers which gives a measure of the shallowness of the water and therefore dispersive effects and delta which gives a measure of the modulation rate due to variations in the undisturbed depth of the water. The range of validity of the variable coefficient KdV equation is given in terms of these parameters and the propagation distance of the wave. (Author)

AD-A087 069/1 PC **A05**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Analysis of Wake Survey and Boundary Layer Measurements for the R/V ATHENA Represented by Model 5366 in the Anechoic Wind Tunnel.
Final rept.,
Rae B. Hurwitz, and Douglas S. Jenkins. Jul 80, 95p Rept no. DTNSRDC/SPD-0833-02

This report presents results of wake survey and boundary layer profile measurements for a model representing a twin-screw displacement ship. These measurements were obtained in a wind tunnel using hot wire anemometers. Wake surveys were conducted in the propeller disk and ahead of the propeller plane with and without the propeller operating. Circumferential distributions of the longitudinal, tangential, and radial velocity components at four radial locations and a harmonic analysis of each component are included. The boundary layer profile measurements were obtained at three longitudinal locations in the area of the shafting and struts. A comparison of full-scale, model-scale towing tank, and wind tunnel measurements is presented. Model-scale boundary layer velocity profiles ahead and astern of the propeller plane were smaller than the full-scale profiles. The model wake surveys ahead of the propeller plane showed no significant differences with and without the propeller operating. The data from the wind tunnel wake survey in the propeller plane agreed better with the full-scale data than the towing tank data.

AD-A087 296/0 PC **A04**/MF **A01**
Lumley (John L) Ithaca NY
The Pressure Footprint of a Turbulent Layer on a Compliant Boundary.
Technical rept. 1 Aug 79-31 Jul 80,
John L. Lumley. 31 Jul 80, 53p
Contract N00014-79-C-0727

An examination was made of one way in which a compliant boundary may affect the low wave number pressure field measured at the surface under a turbulent boundary layer. Specifically, we assume that the low wavenumber pressure field measured at the wall results from the large scale motions in the outer part of the flow, and that these are triggered by the bursting in the buffer layer, which is caused in its turn by secondary instabilities growing on inflectionary profiles caused by longitudinal vortices in the sub and buffer layers. The direct effect of the compliant boundary on the growth of these longitudinal vortices, using the energy method, was examined. We represent the compliant boundary by a half space filled with a linear visco-elastic medium with a single time constant. We find that the effect of the boundary is to introduce an effective slip in the boundary condition on the disturbance (the longitudinal vortices), producing a boundary condition intermediate between the inviscid boundary condition and the no-slip boundary condition. Since this boundary condition is less dissipative, the vortices are less stable, and have a higher growth rate. They might consequently be expected to grow faster and occur more frequently, if this were the only mechanism involved, resulting in a shift of the low wavenumber pressure spectrum to higher frequencies. This appears to be the opposite of observations, suggesting that other mechanisms are involved.

AD-A087 334/9 PC **A04**/MF **A01**
Naval Academy Annapolis MD Div of Engineering and Weapons
Hydrodynamic Coefficients for Vertical Circular Cylinders at Finite Depth,
Tarik Sabuncu, and Sander Calisal. 1980, 74p
Rept no. USNA-EW-11-80

Hydrodynamic coefficients for vertical circular cylinders at finite water depth are obtained and presented for different depth to radius and draft to radius ratios. A summary of equations for computer application is also presented. Limiting values for heave added mass for zero frequency is also discussed. (Author)

Juel-1578 PC **A07**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Dynamic Scaling Near the lambda Point of Liquid Helium and at Bicritical Points.
Habil.Schr,
V. Dohm. Feb 79, 126p
U.S. Sales Only.

The critical dynamics of liquid helium and of uniaxial antiferromagnets at bicritical points are studied by means of renormalized field theory. The problem of dynamic scaling is analyzed in detail. Explicit calculations are performed using the epsilon-expansion in d = 4 - epsilon dimensions. Results in one- and two-loop order, i.e. first and second order in epsilon, are obtained for dynamic critical exponents, dynamic transient exponents, amplitude ratios and scaling functions at and above the critical points. (Atomindex citation 11:507003)

K/ET-5011 PC **A02**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Comparison of the Effect of Non-Random Surface Scattering on Free Molecule and Slip Flow.
D. E. Fain. 1980, 24p CONF-800715-1
Contract W-7405-ENG-26
12. international symposium on rarefied gas dynamics, Charlottesville, VA, USA, 7 Jul 1980.

As a result of this examination of experimental data several tentative conclusions can be drawn. It appears that currently accepted theory cannot calculate the same fraction of diffuse reflection for both slip flow and free molecule flow. Berman's backscattering approximation does not provide any better consistency between the two estimates of diffuse scattering fractions. The author's new result for free molecule flow does appear to provide some better consistency in the calculation of the diffuse fractions. However, in order to get complete consistency, smaller values than are currently accepted for the slip constant and free molecule flow constant are required. The author hopes that these results will provide incentive for further investigation and perhaps additional experimental work. It appears that there is considerably more variation in the diffuse scattering fraction for a given gas with different surfaces than there is for different gases on the same surface. Therefore, the experimental work probably should be directed toward systems with different surfaces and large length to radius ratios. If non-random surface scattering does affect slip and free molecule flow in different ways, then as this examination indicates it can perhaps be used to establish the most accurate theoretical values. (ERA citation 05:026508)

PB80-212087 PC **A02**
New York Sea Grant Inst., Albany.
Permeable Wall Effects on Poiseuille Flow,
Phillip L-F. Liu. Jun 79, 8p NYSG-RR-80-19, NOAA-80062403
Contracts NOAA-44-S043-C, NOAA-44-S051-C
Pub. in Jnl. of the Engineering Mechanics Div., Proceedings of the American Society of Civil Engineers, v105 nEM3 p470-476 Jun 79.

The effects of permeable walls on Poiseuille flow were investigated. Due to the transfer of forward

momentum across the permeable interface, a very thin boundary layer region is induced within the porous material adjacent to the interface. The boundary layer structure is found herein, and it depends strongly on the properties of the material in the boundary regions. The present theory agrees with available experiments very well. However, more controlled experimental data are still needed. The results can be extended to study the interactions between water waves and seabed, which usually consist of permeable material. Although the unsteadiness becomes one of the new features of these types of problems, the oscillatory laminar (or turbulent) boundary layer above the interface in the free fluid is equivalent to the Poiseuille flows considered in the paper. The boundary layer flow within the permeable material (or seabed) could have significant influence on determining the mass transport velocity under the waves.

PB80-813264 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Drag Reducing Fluids. 1969-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1969-Jun 80,
Guy E. Habercom, Jr. Jul 80, 285p
Supersedes NTIS/PS-79/0766 and NTIS/PS-78/0730.

Drag reducing and non-newtonian fluids, along with some studies on elastohydrodynamics, are researched. Theory, chemical formulations, test procedures, and applications are included. (This updated bibliography contains 280 citations, 6 of which are new entries to the previous edition.)

PLF-14 PC A02/MF A01
Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Garching (Germany, F.R.). Projektgruppe fuer Laserforschung.
Nonlinear Stability of Weak Shock Waves in Dissipative Media.
S. I. Anisimov, and V. I. Matsaev. Mar 79, 8p
U.S. Sales Only.

The nonlinear stability of shock waves in viscous and heat-conductive fluids is analyzed by means of perturbation techniques. The analysis is based on Burgers equation and is limited to one-dimensional disturbances. The shock waves are shown to be unstable with respect to a certain kind of perturbation. (Atomindex citation 10:481174)

20E. Masers and Lasers

AD-A086 997/4 PC A02/MF A01
Naval Research Lab Washington DC
Spatial and Temporal Coherence of a 35 GHz Gyromonotron Using the TE01 Circular Mode.
Memorandum rept.,
M. E. Read, R. M. Gilgenbach, R. Lucey, Jr., K. R. Chu, and A. T. Drobot. 20 Jun 80, 22p NRL-MR-4244, AD-E000 486

The characteristics of a 35 GHz oscillator operating with the TE sub 01 circular waveguide mode are described. The device produced 147 kW, with an efficiency of 31% at 100 kW. The total radiated energy was 2 KJ per pulse. The spectral coherence appears to be equal to those of other high quality microwave tubes. The mode purity is greater than 95%. (Author)

AD-A087 056/8 PC A02/MF A01
Maryland Univ College Park Dept of Physics and Astronomy
Resonant Interaction between an Active Molecular Medium and a Free Electron Laser.
Technical rept.,
H. Wilhelmsson. Dec 79, 19p Rept nos. PUB-80-116, TR-80-068
Contract N00014-80-C-0050

The system of a relativistic electron beam and an active molecular (maser) medium in the presence of a ripple magnetic field is studied theoretically. The tunability of the free electron laser could be used to reach different lines of such a molecular medium. We use a Lorentz model to describe the molecular transitions, a hydromagnetic model for the beam, and formulate the resonance condition for the two cases where (1) the coupling occurs at a common interface, e.g., cylindrical, between the beam and the molecular medium, and (2) the beam and the molecules fill the same volume in space. The coupling between the beam and the molecules offers possibilities of enhanced radiation and improved coherence. In the case where the free electron laser acts as a pump of the molecules stimulated radiation could in principle be obtained at a new wavelength, i.e., the coupled system acts as a frequency transformer. (Author)

AD-A087 123/6 PC A02/MF A01
Joint Inst for Lab Astrophysics Boulder CO
Optical and Discharge Studies of Novel Electronic Transition Laser Species.
Technical rept.,
Stephen R. Leone. 4 Jan 80, 18p
Contract N00014-77-C-0115, ARPA Order-2840

A new class of diatomic lasers has been developed by optical pumping. These lase on lines in the near ultraviolet and visible regions of the spectrum. Optical excitation studies show that these molecular systems have high efficiency, may be scalable to high average powers, are nondegradable, and offer promise for pumping by other excitation schemes, such as electric discharge. It is possible that one or more candidate systems in this category of lasers might be useful in generating blue-green radiation for underwater applications. Preliminary investigations with electric discharge excitation show good formation of glow dischargers in sulfur dimer vapor. Materials problems and the difficulties of high temperature discharge technology appear to be the major drawbacks in pursuing such studies further for laser action.

AD-A087 245/7 PC A05/MF A01
Stanford Univ CA Edward L Ginzton Lab
Laser Physics and Laser Techniques.
Final technical rept., 1 Jan 77-31 Dec 79,
A. E. Siegman, and R. L. Byer. Feb 80, 98p GL-3093, AFOSR-TR-80-0551
Contract F49620-77-C-0092

A three-yrea program research in laser physics and techniques has been carried out to help meet Air Force mid- and long-term requirements. Development of an optically pumped atomic mercury laser was completed. Picosecond spectroscopy experiment led to measurements of ultrafast relaxation and diffusion times in solids. Work on efficient numerical methods for optical resonator calculations resulted in a Fast Hankel Transform for calculations in cylindrical coordinates. Improvements to the FHT algorithm have been made and a two-stage algorithm developed. An efficient procedure for analyzing nonlinear beam interactions has been developed; also several fundamental questions on aspects of laser resonators have been resolved. A diffraction-biased ring resonator was invented, and an analysis of phase conjugate mirror resonators carried out. Studies of optically pumped lasers including mercury dimer as a potential laser mechanism were carried out. A number of two photon laser systems were investigated, and studies of four-wave mixing as a frequency conversion process completed. Improvements in the growth of lithium niobate crystals led to higher power tunable infrared and visible sources. Finally, stimulated rotational Raman scattering was demonstrated for efficient frequency conversion in the infrared.

AD-A087 421/4 PC A03/MF A01
Illinois Univ At Urbana-Champaign Electro-Physics Lab
Short Intense Submillimeter Pulse Generation.
Final rept. 1 Jul 79-30 Jun 80,
Thomas A. DeTemple. Jul 80, 27p UILU-ENG-80-2546, ARO-16751/2-P
Contract DAAG29-79-C-0075

The use of a mode-locked CO2 laser for an optically pumped near millimeter wave source has been refined and extended to the genertion of pulses form C(13)H3F at 1.22mm. More refined theoretical estimates illustrate the transient nature of the conversion process in both space and time and set approximate limits on the ultimate pulse duration to be about one-half that of the pump. The implications are that one is not limited by the intrinsic linewidth in producting short pulse and that significant conversion may occur in modest distances, of order meters, suggesting quasi-compact sources for further experiments. (Author)

PATENT-4 206 364 Not available NTIS
Department of the Navy Washington DC
Device for Producing Extended Elongated Plasmas for X-Ray Lasers.
Patent,
Robert H. Dixon, Raymond C. Elton, and John F. Reintjes. Filed 16 Jan 79, patented 3 Jun 80, 4p
AD-D007 381/7, PAT-APPL-6-003 696
Supersedes PAT-APPL-6-003 696, AD-D005 736.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In an evacuated housing, a pair of tungsten blocks are placed just above a target surface and spaced apart to form a channel. A high power laser beam is focused to a point on the target creating a plasma between the blocks. As the plasma expands away from the target in the z-direction, the tungsten blocks confine the plasma in the y-direction and plasma species of higher stages of ionization are formed into a jet of rectangular x-y cross section in the z-direction by the blocks. The plasma remains confined in the y-dimension or is focused in this direction above the blocks where sufficient amplification occurs to provide x-ray lasing along the x-axis.

20F. Optics

AD-A087 003/0 PC A04/MF A01
Naval Research Lab Washington DC
Transmittance Measurements at DIRT-II.
Final rept.,
Joseph A. Curcio, Kenneth M. Haught, and Michael A. Woytko. 10 Jul 80, 52p NRL-MR-4260, AD-E000 484

This is a report on the NRL experiments at the DIRT-II tests sponsored by the Atmospheric Sciences Laboratory at the White Sands Missile Range in July 1979. The NRL experiment was designed to measure spectral transmittance through smoke and dust clouds generated by detonations of various explosive charges and also by impact of artillery rounds. Spectral transmission data as a function of time for 0.55 micrometers, 1.06 micrometers, and 10.37 micrometers were obtained for 63 events comprised of static detonations and artillery rounds. Transmission data for 1.06 micrometers, in most cases were similar and equal to 0.55 micrometers. In dry soil conditions the 10.37 micrometers channel showed higher transmittance values than the visible channel. There are indications that 10.37 micrometers transmittance in wet soil events is lower than visible presumably because of strong liquid water absorption at the IR wavelength. (Author)

AD-A087 043/6 PC A05/MF A01
Pacific-Sierra Research Corp Santa Monica CA
Multiple Scattering in Clouds.
A. P. Ciervo. Sep 79, 76p Rept no PSR-923
Contract N00014-78-C-0751, DARPA Order-3650

This report develops an analytic model for the propagation of an optical pulse through a multiple scattering medium. Such a model is needed to investigate the effect of clouds on optical communications from a satellite to a submarine. A key initial result is the derivation of simple expressions for the first two spatial and angular moments of the radiance distribution for a narrow delta-function source immersed in an infinite scattering medium. The moments support a diffusion approximation for the transport process in an infinite plane-parallel cloud. First the radiance is calculated at the cloud exit and on a plane an arbitrary distance below the cloud, then power collected by a finite receiver located on this plane is computed. The model is validated by comparing its results with computer simulation curve fits for optically thick clouds (i.e., tau $>$ 15). The model is capable of duplicating nearly all the simulation results but at significantly lower cost. Furthermore, detailed calculations impractical to simulate are readily computed. (Author)

AD-A087 046/9 PC **A04**/MF **A01**
Texas A and M Univ College Station Dept of Physics
Ocean-Atmosphere Interface: Its Influence on Radiation,
Gilbert N. Plass, Terry J. Humphreys, and George W. Kattawar. 22 May 80, 61p Rept no. TR-14
Contract N00014-80-C-0113

The influence of the ocean-atmosphere interface on the radiance distribution in both the ocean and atmosphere is investigated. At visible wavelengths in the real ocean just below the surface, the downwelling radiance is a maximum within the critical angle and drops off by one or two orders of magnitude toward the horizon. The usual explanation that this is due to the sky radiation concentrated within the critical angle and the total internal reflection of the weak upward radiance at the ocean surface at angles outside the critical angle is too simplistic. There are two other important factors: (1) the atmosphere must have sufficient optical thickness so that appreciable sky (multiple scattered) radiation develops at all angles in the downward direction; and (2) the water must have appreciable absorption so that the upwelling radiance just below the ocean surface is only a small fraction of the downwelling radiance entering the ocean. The radiance distribution in a homogeneous medium is compared with that in the same medium with an atmosphere-ocean interface at various depths within the medium. Most of the calculations are done for Rayleigh scattering centers, but some results are given for Mie type scattering.

AD-A087 160/8 PC **A02**/MF **A01**
City Coll New York Dept of Physics
Theory of Nonlinear Pulse Propagation in Optical Waveguides,
Bernard Bendow, Peter D. Gianino, Narkis Tzoar, and Manoj Jain. 18 Apr 79, 10p RADC/ETR-80-0023
Contract F19628-77-C-0144
Pub. in Jnl. of the Optical Society of America, v70 n5 p539-546 May 80.

No abstract available.

AD-A087 207/7 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Unsteady Thermal Blooming of Intense Laser Beams.
Final rept. 1975-1977,
J. T. Ulrich, and P. B. Ulrich. 31 Jan 80, 19p NRL-8352, AD-E000 476

A four-dimensional (three space plus time) computer program has been written to compute the nonlinear heating of a gas by an intense laser beam. Unsteady, transient cases are capable of solution and no assumption of a steady state need be made. The transient results are shown to asymptotically approach the steady-state results calculated by the standard three-dimensional thermal blooming computer codes. The report discusses the physics of the laser-absorber interaction, the numerical approximation used, and comparisons with experimental data. A flowchart is supplied in the appendix to the report.

AD-A087 248/1 PC **A02**/MF **A01**
Aerospace Corp El Segundo CA Aerophysics Lab
Sensitive Measurement of Photon Lifetime and True Reflectances in an Optical Cavity by a Phase Shift Method.
Technical rept.,
J. M. Herbelin, J. A. McKay, M. A. Kwok, R. H. Ueunten, and D. S. Urevig. 10 Jul 80, 23p TR-0080(5610)-2, SD-TR-80-48
Contract F04701-79-C-0080

A simplified method for measuring the effective photon lifetime in an optical resonator was developed. The technique requires the passage of a modulated continuous-wave laser beam through the resonator and the measurement of the resultant shift in the phase of the transmitted intensity. The method not only permits a quick and precise measurement of the mirror reflectances, but also permits these measurements to be in situ. Such an 'on the spot' evaluation capability should be extremely useful in applications ranging from the investigation of new laser systems to the development of improved optical coatings. The method is also sensitive to the effects of absorption, scattering, and transmission from elements in the cavity. Cavity losses smaller than 100 ppm were detected. (Author)

AD-A087 389/3 MF **A01**
State Univ of New York At Albany Space Astronomy Lab
Experimental Results of Multiple Scattering.
Final rept.,
Donald W. Schuerman, and Ru. T. Wang. Jul 80, 54p ARO-16686.2-A-GS
Contract DAAG29-79-C-0055
Availability: Microfiche copies only.

This report consists of two separate articles in which microwave analog measurements of scattering by non-isotropic spheres, stacked 7-cylinder rough particles, and 2n(n=1,2,3) spheres are presented. Emphasis is placed on extinction measurements (theta = 0 deg scattering) but some side scattering data (40 deg < theta < 140 deg) is presented in the first paper which is devoted solely to scattering by multiple spheres. (Author)

AD-A087 410/7 PC **A02**/MF **A01**
University of Southern California Los Angeles
Raman-Induced Kerr Effect Studies.
Final rept. 15 Jul 76-14 Jul 79,
Robert W. Hellwarth. 10 Jun 80, 14p ARO-14188.1-P
Grant DAAG29-76-G-0295

The Raman-Induced Kerr Effect, developed at U.S.C. is a new form of laser spectroscopy which is beginning to find wide application as a remote diagnostic sensor of fast (picosecond to nanosecond) transient shocks, explosions, and plasma arcs.

PATENT-4 179 219 Not available NTIS
Department of the Navy Washington DC
Revolving Mirror Scanning Interferometer.
Patent,
Stanley T. Smith. Filed 10 Apr 78, patented 18 Dec 79, 6p AD-D007 391/6, PAT-APPL-894 675 Supersedes PAT-APPL-894 675-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A spectral scan by using a rotating spiralling toroidal mirror. The scan is made of a light beam from a source. A beamsplitter divides the beam into two components. One component is reflected off of a fixed mirror back to the beamsplitter. The second component is reflected off of the spiralling toroidal mirror back to the beamsplitter. As the mirror rotates, the pathlength constantly changes producing an interference pattern for all wavelengths within the range of the instrument. (Author)

PATENT-4 189 652
Not available NTIS
Department of Energy, Washington, DC.
Beam Splitter Coupled CdSe Optical Parametric Oscillator.
Patent,
N. J. Levinos, and G. P. Arnold. Filed 22 Aug 77, patented 19 Feb 80, 6p PAT-APPL-826 903 Supersedes PAT-APPL-826 903-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An optical parametric oscillator is disclosed in which the resonant radiation is separated from the pump and output radiation so that it can be manipulated without interfering with them. Thus, for example, very narrow band output may readily be achieved by passing the resonant radiation through a line narrowing device which does not in itself interfere with either the pump radiation or the output radiation. (ERA citation 05:028431)

PB80-208267 Not available NTIS
National Bureau of Standards, Washington, DC.
NBS (National Bureau of Standards) Reference Retroreflectometer.
Final rept.,
K. L. Eckerle, J. J. Hsia, V. R. Weidner, and W. H. Venable, Jr. 1980, 7p
Pub. in Applied Optics 19, n8 p1253-1259, 15 Apr 80.

A long-range retroreflectance instrument has been built in the photometric range of the radiometric Physics Division of the NBS. It is designed to measure photometric properties of retroreflectors for different geometries. It satisfies many needs of the measurement community, and it is planned to use this instrument as the basis for a Measurement Assurance Program (MAP) and for Standard Reference Materials (SRM). This paper describes the design and testing of the instrument. Some estimated uncertainties for typical samples are given.

20G. Particle Accelerators

AD-A087 001/4 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Collective Acceleration of Electrons Using Autoacceleration Process.
Memorandum rept.,
Thomas R. Lockner, and Mashe Friedman. Jul 80, 32p NRL-MR-4256, AD-E000 494
ARPA Order-3718

A means of collectively accelerating an intense electron beam is demonstrated. A long pulse (800ns) electron beam is propagated through cavity structures which redistributed the energy in the beam such that most of the beam energy is transferred to a short segment (6 nsec) in the tail of the bram; Electrons are accelerated in a two cavity system from 200 KeV to energies of 2.4 - 3.0 MeV at a beam current of approx. 8 kA. The extension of this principle to larger number of cavities appears feasible. (Author)

AD-A087 055/0 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Physics and Astronomy
A 1-D Computer Simulation Model of Collective Ion Acceleration by Linear Electron Beams.
Technical rept.,
A. Sternlieb, and Han S. Ulm. May 79, 35p Rept nos. PUB-80-010, TR-80-007
Contract N00014-80-C-0050

A 1-d electrostatic and relativistic particle code has been built in order to simulate a self-consistent way the time-dependent behavior of collective ion acceleration produced by linear electron beams injected into evacuated drift tubes. The simulation results agree with existing experimental and theoretical results by showing good current propagation and high ion energy gain in the presence of a well-localized plasma source at the e-beam injection boundary. Moreover, the simulations display an unexpected phenomenon, the appearance of short-lived regions of positive electrostatic potential (virtual anodes) which together with the usual virtual cathodes, contribute to the ion acceleration mechanism. In the absence of a suitable analytical theory, it seems to us that the present computer model is an indispensable tool for reliable explanation and optimization of present and future collective ion acceleration experiments. Use of our model in laser-plasma experiments in suggested. (Author)

LA-UR-80-1360 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Spallation Target-Moderator-Reflector Studies at the Weapons Neutron Research Facility.
G. J. Russell, J. S. Gilmore, S. D. Prael, H. Robinson, and S. D. Howe. 1980, 26p CONF-800551-9
Contract W-7405-ENG-36
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

Basic neutronics data, initiated by 800-MeV proton spallation reactions, are important to spallation neutron source development and electronuclear fuel production. Angle-dependent and energy-dependent neutron production cross sections, energy-dependent and total neutron yields, thermal and epithermal neutron surface and beam fluxes, and fertile-to-fissile conversion ratios are being measured. The measurements are being done at the Weapons Neutron Research facility on

a variety of targets and target-moderator-reflector configurations. The experiments are relevant to the above applications, and provide data to validate computer codes. Preliminary results are presented and compared to calculated predictions. 13 figures. (ERA citation 05:026250)

20H. Particle Physics

CNRS-CPT-78-P-992 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
New Impact Picture for Low and High Energy Proton-Proton Elastic Scattering.
C. Bourrely, J. Soffer, and Tai Tsun Wu. May 78, 42p
U.S. Sales Only.

The impact picture that was used several years ago to predict the increase of total and integrated differential cross sections at high energies was improved significantly. The major improvements consist of the following: (1) the dependence of the Pomeron term on the momentum transfer is taken from a modified version of the relation between matter distribution and charge distribution; (2) Regge backgrounds are properly taken into account; and (3) a simple non-trivial form is used for the hadronic matter current in the proton. For proton-proton elastic scattering, the phenomenological differential cross section is in good agreement with the experimental data in the laboratory momentum range of 14 GeV/c to 2000 GeV/c, and is predicted for ISABELLE energy. Because of the third improvement, predictions are obtained for both polarization and R parameters for proton-proton elastic scattering. (Atomindex citation 11:504167)

CRN-HE-78-15 PC **A06**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Production of Lepton Pairs with Associated Final State: Plan of an Experiment.
J. M. Brom. 1978, 110p
In French.
U.S. Sales Only.

The production of Drell-Yan pairs is studied, in reactions like h+h implies l+l exp - +X---, where the charged part of the associated final state is detected. The first part presents some theoretical aspects, relative to the Drell-Yan mechanism and to models dealing with the associated final state. The second part presents a possible experimental set-up in order to study this physics, based on vertex detection with fast electronic detectors, and makes estimations for the expected number of events. In the last part, there is evaluated the pattern recognition program of the events where one pair of leptons is detected. The recognition program is analyzed and its performance is presented. (Atomindex citation 11:504169)

CRN-HE-78-22 PC **A05**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Study of Single Pion Production in Antineutrino Induced Charged Current Interactions.
T. Bolognese. 1978, 81p
In French.Thesis.
U.S. Sales Only.

Results are presented on the exclusive charged current antineutrino production of one pion using the data of the Gargamelle propane experiment at CERN PS. The isospin structure of the charged weak current is studied as well as the energy dependence of the total cross section for pi exp - antineutrino production, which is compared with the prediction of Adler's model. (Atomindex citation 11:504166)

CRN-HE-78-26 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Single Pion Production in Antineutrino Induced Charged Current Interactions.
T. Bolognese, J. P. Engel, J. L. Guyonnet, and J. L. Riester. 1978, 13p
U.S. Sales Only.

Results are presented on the exclusive charged current antineutrino production of one pion using the data of the Gargamelle propane experiment at CERN PS. The isospin structure of the charged weak current is studied as well as the energy dependence of the total cross-section for pi exp - antineutrino production, which is compared with the prediction of Adler model. (Atomindex citation 11:504165)

CRN-HE-78-27 PC **A08**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Study of Antiproton-Deuterium Interactions at 9.2 GeV/C.
Pierre Juillot. 1978, 158p
In French.Thesis.
U.S. Sales Only.

Results on anti pd interactions at 9.2 GeV/c obtained in a bubble chamber experiment are presented. The channels of production of one and two pions are investigated with a special care on the variation of resonance production as a function of the c.m. energy. The coherent reactions and the d* phenomenon are studied. A differential isospin analysis of the reaction anti pN implies anti NN pi is performed by using the result obtained in a similar anti pp experiment at 9.1 GeV/c. (Atomindex citation 11:504187)

DESY-79/44 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Chiral U(1) Symmetry and Weak Neutral Currents at High Energy.
T. C. Yang. Jul 79, 26p
U.S. Sales Only.

If chiral U(1) symmetry is a gauge symmetry, CP is automatically conserved despite the instance effects, and the weak neutral currents have a definite structure. A realistic SU(2)sub(L) X U(1) X U(1)sub(R) model contains an axion which is consistent with present data. Furthermore the neutrino interactions to lowest order are identical to the Weinberg-Salam model. Implications for the chiral U(1) currents are discussed. (Atomindex citation 11:504132)

DESY-79/47 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Jet Propulsion in E exp + E exp - Annihilation and Decays of the Y(9.46) Resonance. Results from PLUTO.
G. Knies. Aug 79, 30p
U.S. Sales Only.

Electron positron annihilation events, measured by the PLUTO detector at energies Q from 3.6 to 17 GeV at DORIS and PETRA, are used to study the properties of hadronic jets. We find good agreement with the picture of qantiq pair production and subsequent fixed perpendicular fragmentation. Evidence for b quark production is discussed. The Y(9.46) decays are investigated in the context of the 3-gluon decay expected from QCD, on the basis of charged tracks. We observe an increase of track multiplicity and of sphericity as expected for a 3-gluon decay. A new measure for flatness as the consequence of an original planar configuration is defined. The Y events are compared to events from the nearby continuum, and from model calculations for qantiq jets, for phase space and for a 3-gluon decay, under the assumption that gluon fragmentation is like quark fragmentation. The 3-gluon decay model compares well with the data in many respects. (Atomindex citation 11:504189)

DESY-79/49 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
First Results from Pluto at Petra exp +.
W. Wagner. Aug 79, 25p
U.S. Sales Only.

With the PLUTO detector at the e exp + e exp - storage ring PETRA we have collected about 130 nb exp -1 at 13 GeV and 17 GeV (CMS energy). We have measured the R-value to be 5. +- .5 at 13 GeV and 4.3 +- .5 at 17 GeV. From the large angle Bhabhas we calculate a QED cut off parameter lambda > 42 GeV. A first analysis of two photon events leads to a cross section sigma/sub gamma gamma) implies had/ = (.3 + .9/W/sub vis/) nb. (Atomindex citation 11:504208)

DESY-79/56 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Search for a 'Top' Threshold in Hadronic E exp + E exp - Annihilation at Energies Between 22 and 31.6 GeV.
C. Berger, H. Genzel, R. Grigull, W. Lackas, and F. Raupach. Sep 79, 9p
U.S. Sales Only.

Results on e exp + e exp - annihilation into hadrons at c.m. energies between 22 and 31.6 GeV are presented. The data were accumulated with the PLUTO detector at PETRA. The events are dominantly of the two-jet type. The value of the relative hadronic cross section R = 3.88 +- 0.22 along with the details of the sphericity and thrust distribution rule out an open (t anti t) channel (Q/sub t/ = 2/3) below 30 GeV. The inclusive muon results support the above conclusion. (Atomindex citation 11:504162)

GSI-79-9 PC **A07**/MF **A01**
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.).
Investigation of Compressed and Highly Excited Nuclear Matter in Relativistic Heavy Ion Collisions.
H. Stoecker. Aug 79, 134p
In German.
U.S. Sales Only.

The gross properties of nuclear matter at high densities and temperatures and the significance of the nuclear equation of state for high energy nuclear collisions are investigated within the nuclear fluid dynamical model. The hydrodynamical description and the properties of the nuclear fluid are extensively discussed. It is shown that at bombarding energies of 1-4 GeV/n compressions of 3-6 p/sub o/ and temperatures T approx. 100 MeV can be reached. At medium energies we compare the nuclear fluid dynamical model and the time-dependent Hartree-Fock model. The importance of isobaric resonance - and pion production at higher energies - is discussed, which for an exponentially increasing hadronic mass spectrum leads to a limiting temperature T/sup Max/. (Atomindex citation 11:504310)

IPNO-TH-78-08 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Coulomb Displacement Energies in Nuclei: A New Approach.
N. Auerbach, V. Bernard, and V. G. Nguyen. Apr 78, 39p
U.S. Sales Only.

The neutron core polarization gives rise to an important correction to the direct Coulomb contribution when one calculates the Coulomb displacement energies. In the Hartree-Fock model it is shown that this correction is about 2% to 4.5% in intermediate and heavy nuclei. The core polarization as well as other higher-order effects can be included by using a self-consistent description of the analog state in a complete proton particle-neutron hole space. The Coulomb displacement energies in exp 48 Ca, exp 88 Sr and exp 208 Pb have been calculated using Skyrme interactions SIII and SIV. A good agreement with experiment is obtained. (Atomindex citation 10:481462)

IPNO-TH-78-38 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Coulomb Displacement Energies and Hartree-Fock Densities.
N. Auerbach, V. Bernard, and V. G. Nguyen. Oct 78, 10p
U.S. Sales Only.

Coulomb displacement energies in mirror nuclei are calculated using Hartree-Fock densities. The inclusion of an important core contribution leads to the resolution of the long-standing anomaly. (Atomindex citation 10:481463)

ITEP-165(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Experimental Arguments in Favor of 5/2 Isospin Isobars.
A. F. Nilov, A. B. Kaidalov, G. S. Lomkatsi, and V. T. Smolyankin. 1978, 17p
U.S. Sales Only.

A search for baryon resonances with the 5/2 isotopic spin was carried out. Experimental data were obtained in pi exp - p interactions in a hydrogen bubble chamber at 4.5 GeV/c. The investigated channels of the reaction were n pi exp + pi exp + pi exp - pi exp - , p pi exp + pi exp - pi exp - pi exp 0 and p pi exp + pi exp - pi exp - . The effective mass distributions of the products of the reaction were presented. The results of the paper pointed out that 5/2 isobars could be produced in the first channel which corresponded with the Feynman diagram with the delta exp - (1232) exchange. Particle production of the delta exp + + (1232) isobar in the second and third channels was indirect evidence in favor of 5/2-isospin isobars. (Atomindex citation 11:504202)

ITEP-8(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Measurement of the Proton Screening Correction in a Deuteron for Reactions pi exp - + p(D) Implies pi exp + + X.
B. M. Abramov, I. A. Dukhovskoj, V. S. Fedoretz, V. V. Kishkurno, and L. A. Kondratyuk. 1979, 15p
U.S. Sales Only.

The proton screening correction delta/sub p/ in a deuteron has been measured by comparative investigation of reactions pi exp - d implies pi exp + X exp - and pi exp - P implies pi exp + X exp - at pi sub 0 =2.6 GeV/c and pi sub(perpendicular) exp 2 = 0.0025+-0.0025(GeV/c) exp 2 . In the region under investigation the reaction pi exp - n implies pi exp + X exp - - is kinematically forbidden. On the basis of the value delta/sub p/=0.177+-0.019 the Glauber parameter was found to be <r exp 2 >=0.37+-0.05 fm. (Atomindex citation 11:504136)

Juel-1563 MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nuklearchemie.
Range Calculations for Spallation Recoils in ThF sub 4 by Use of the Computer Code 'Marlowe'.
W. Westmeier, and K. Roessler. Dec 78, 47p
U.S. Sales Only. Microfiche copies only.

The determination of cross sections of spallation reactions requires a knowledge of the target thickness since only the products recoiling from the target are measured and their yield depends on the range. The effective target thickness is a function of the projectile Z, A and spallation recoil energy and, thus, varies for the individual products. The computer code MARLOWE was used to evaluate energy vs. range curves in the binary collisions approximation. The program was extended to the high energy regime with account taken of the stripping of electrons from the projectile and the concomitant changes in the interaction potentials, especially for the inelastic part of the collisions. A complementary computer program LATTIC was developed for the parameterization of the lattice description. This code enables the application of MARLOWE to target materials with complicated crystallographic structure. Test calculations for a series of projectile/target combinations showed a reasonable agreement with experimental recoil ranges of Pd, Ag, Os and Ir isotopes from proton induced spallation in Ag, In and Pb targets. MARLOWE was then applied to calculate product ranges of the exp 232 Th(p,spall)X reaction in the polyatomic system ThF sub 4 . The calculated energy vs. range curves enabled the evaluation of the mean spallation recoil ranges for all possible products, e.g. 170.8 mu g/cm exp 2 for exp 192 Tl, 115.2 mu g/cm exp 2 for exp 208 At and 37.1 mu g/cm exp 2 for exp 223 Ac. (Atomindex citation 11:504318)

KFTI-79-20 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Mu E Universality Problem in the Unified Models of Weak and Electromagnetic Interactions.
M. P. Rekalo, V. A. Koval'chuk, and A. P. Rekalo. 1979, 8p
U.S. Sales Only.

The unified SU(2)xU(1) model of the weak and electromagnetic interactions of leptons and quarks is suggested. In this model the mu e universality is violated for the neutral current weak interactions: the muonic neutral weak current is a vector, while the electronic neutral weak current is a sum of both vector and axial-vector parts. The mu e universality of charged current weak interaction and electromagnetic interaction is conserved in the suggested model. The model is generalized to hadronic processes. (Atomindex citation 11:504107)

LAL-1296 PC **A08**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Study of the Coherent Production on Carbon of p pi exp + pi exp - and N pi exp + Systems by 19GeV/C Protons.
J. Y. Grandpeix. Sep 77, 172p
In French.Thesis.
U.S. Sales Only.

The production reactions pC implies n pi exp + C and pC implies p pi exp + pi exp - C have been studied at 19GeV/c in the CERN 'Gargamelle' bubble chamber, for low transverse momenta of the recoiling target. Both channels exhibit coherent peaks in the distributions of transferred momentum. The mass spectra of the coherently produced events show enhancements at 1.25GeV/c in the n pi exp + channel and at 1.41 and 1.67GeV/c in the p pi exp + pi exp - channel. The comparison of the values obtained for the branching ratios of these enhancements into n pi exp + and p pi exp + pi exp - with those measured in formation experiments demonstrates that the production of N* resonances does not contribute in a dominant way to these enhancements. The precision required for this analysis was obtained through a detailed study of the parameters of the bubble chamber's optics and, in particular, by taking into account the variation of these parameters from one expansion of the chamber to another. (Atomindex citation 11:504179)

LAL-78-04 PC **A10**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Study of nu +N implies nu +N+ pi and Isospin Analysis of the Hadronic Neutral Current.
C. Longuemare. Apr 78, 207p
In French.Thesis.
U.S. Sales Only.

Experimental results are presented on neutrino-induced single pion production in the bubble chamber Gargamelle filled with a light propane-freon mixture and exposed to the CERN PS neutrino beam. After corrections for reinteractions in the target nuclei, the neutrino neutral current cross section and the branching ratios are determined. The isospin structure of the hadronic neutral current is analyzed. The conclusions are compatible with the Weinberg-Salam theory for weak and electromagnetic interactions. The isoscalar component of the neutral current is observed at the level of two standard deviations. The charged to neutral current ratio may be intepreted with the one pion production model of Adler in the framework of the above theory. (Atomindex citation 11:504196)

LAL-78-23 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Status of the Narrow Baryon Anti-Baryon Structures Found in omega Spectrometer Experiments.
J. Six. Jun 78, 18p
U.S. Sales Only.

Status of BantiB structures from experiments in omega spectrometer is reviewed. Published results on narrow BantiB states found in omega spectrometer are reviewed. New results on negative search for other decay modes and the pantip state are given for the M exp 0 (2020) and M exp 0 (2204) resonances. A negative search for an M exp - state is reported from the reaction pi exp - p implies p/sub F/antipn. This result leads one to conclude that the M exp 0 (2020) and M exp 0 (2204) states have a small delta antiN or delta N coupling, less than the NantiN coupling by at least an order of magnitude. (Atomindex citation 11:504207)

LBL-10624 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Search for Extreme States in Nuclear Matter (Or Looking for Collective Phenomena).
H. H. Gutbrod. Mar 80, 15p CONF-800232-2
Contract W-7405-ENG-48
International conference on extreme states in nuclear systems, Dresden, German Democratic Republic, 4 Feb 1980.

After some introductory background material, the report discusses data from single-particle inclusive reactions with emission of nucleons and pions. The anomalous neutron-to-proton ratio is explained; pion data show a possible indication of a long-lived fireball. The other major topic is multiparticle correlations (noninclusive data). The energy dissipation in the target nucleus and the process of total disintegration (target explosion) leads over to pressure effects (bounce-off) in the heavy fragment data. The weakness of the fireball/fire streak model is pointed out; the cascade models and the hydrodynamical models are discussed as to their qualitative and quantitative agreement with the data. 35 references, 28 figures. (ERA citation 05:026601)

ORO-4935-035 PC **A02**/MF **A01**
Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
Structure of Nuclei Far from beta Stability. Progress Report, May 15, 1979-May 14, 1980.
E. F. Zganjar. 1980, 21p
Contract EY-76-S-05-4935

The philosophy behind the experimental approach is described. A list of reports on completed work is given. Comments are offered on work on Au, Tl, and Hg isotopes, neutron-deficient nuclei with 50 less than or equal to (Z,N) less than or equal to 82, and neutron-rich nuclei with 28 less than or equal to Z less than or equal to 50 and 50 less than or equal to N less than or equal to 82. No data are presented, as this work has been reported at length in numerous reports and journal articles. Experimental equipment and procedures and data analysis are summarized briefly. (ERA citation 05:026605)

PB80-205917 Not available NTIS
National Bureau of Standards, Washington, DC.
Scaling Parameter for Backscattering of Electrons at Perpendicular Incidence.
Final rept.,
C. Eisenhauer. Jun 80, 3p
Pub. in Transactions of the American Nuclear Society 34, p654-656 Jun 80.

A scaling parameter gamma(r sub 0) is suggested for understanding backscatter of electrons from material. This parameter is the product of r0, the continuous-slowing-down range and gamma, the reciprocal of the transport mean free path. Experimental data for backscattering of electrons of varying energies perpendicularly incident on various materials are plotted as a function of gamma(r sub 0). The results cluster along a single curve for backscatter coefficients ranging from 0.003 to 0.5, for electron source energies between 30 keV and 20 MeV, and for materials with atomic numbers between 6 and 82.

SLAC-PUB-2491 PC **A02**/MF **A01**
California Univ., Davis. Dept. of Physics.
Low p/sub T/ Fragmentation in QCD.
J. F. Gunion. Apr 80, 8p CONF-800374-1
Contract AC03-76SF00515
15. Rencontre de Moriond, Les Arcs, France, 9 Mar 1980.

A brief summary of the applications of quantum chromodynamics to low p/sub T/ processes is presented. (ERA citation 05:026576)

SLAC-PUB-2492 PC **A02**/MF **A01**
California Univ., Davis. Dept. of Physics.

Xi-Scaling.
J. F. Gunion. Apr 80, 6p CONF-800374-2
Contract AC03-76SF00515
15. Rencontre de Moriond, Les Arcs, France, 9 Mar 1980.

A class of purely kinematical corrections to xi-scaling is exposed. These corrections are inevitably present in any realistic hadron model with spin and gauge invariance and lead to phenomenologically important M/sub hadron/ exp 2 /Q exp 2 corrections to Nachtmann moments. (ERA citation 05:026515)

20I. Plasma Physics

AD-A087 214/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
MHD Plasma Channel Response to Propagating Ion Beams.
Memorandum rept.,
D. G. Colombant, D. Mosher, and Shyke A. Goldstein. 24 Jun 80, 15p NRL-MR-4252, AD-E000 473

Hydrodynamic response of plasma channels induced by intense propagating ion beams is examined using both analytical estimates and a one-dimensional radial numerical model. It is found that mega-ampere, 3-5 MeV proton beams can be propagated in deuterium background over several meters.

PAT-APPL-6-071 603 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Device and Method for Electron Beam Heating of a High Density Plasma.
Patent Application,
L. E. Thode. Filed 31 Aug 79, 40p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device and method for relativistic electron beam heating of a high density plasma in a small localized region are described. A relativistic electron beam generator produces a high voltage electron beam which propagates along a vacuum drift tube and is modulated to initiate electron bunching within the beam. The beam is then directed through a low density gas chamber which provides isolation between the vacuum modulator and the relativistic electron beam target. The relativistic beam is then applied to a high density target plasma which typically comprises DT, DD, hydrogen boron or similar thermonuclear gas at a density of 10 exp 17 to 10 exp 20 . (ERA citation 05:031329)

PATENT-4 183 671
Not available NTIS
Department of Energy, Washington, DC.
Interferometer for the Measurement of Plasma Density.
Patent,
A. R. Jacobson. Filed 14 Mar 78, patented 15 Jan 80, 4p PAT-APPL-886 377
Supersedes PAT-APPL-886 377-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An interferometer is described which combines the advantages of a coupled cavity interferometer requiring alignment of only one light beam, and a quadrature interferometer which has the ability to track multi-fringe phase excursions unambiguously. The device utilizes a Bragg cell for generating a signal which is electronically analyzed to unambiguously determine phase modulation which is proportional to the path integral of the plasma density. (ERA citation 05:029880)

20J. Quantum Theory

CNRS-CPT-77-P-923 PC **A02**/MF **A01**
Aix-Marseille-1 Univ., Marseille (France).
Quantization of the Geodesic Flow of the S/Sup n/ Sphere.
J. Elhadad. Jun 77, 7p
In French.
U.S. Sales Only.

The problem consists in defining a H operator on a Hilbert space representing a 'quantum Hamiltonian' by using the 'Maslovian pairing' method previously described for the symplectic Rsup(2n) manifold. (Atomindex citation 09:412342)

20K. Solid Mechanics

AD-A086 949/5 PC **A03**/MF **A01**
Oakland Univ Rochester MI School of Engineering
Experimental Analysis of Displacements and Shears at the Surface on Contact between Two Loaded Bodies,
C. Bremond, and A. J. Durelli. Jul 80, 38p Rept no. 54
Contract N00014-76-C-0487

The displacements which exist at the contact between two loaded bodies depend on the geometry of the surface of contact, the type of the loading and the property of the materials. A method has been developed to determine these displacements experimentally. A grid has been photographically printed on an interior plane of a transparent model of low modulus of elasticity. The displacements were recorded photographically and the analysis was conducted on the photographs of the deformed grids. Shears were determined from the change in angles. The precision of the measurements at the interface is estimated to be plus or minus 0.05 mm. Examples of application are given for the cases of loads applied normally and tangentially to a rigid cylindrical punch resting on a semi-infinite soft plate. Important observations can be made on the zones of friction and of slip. The proposed method is three-dimensional and the distributions can be obtained at several interior planes by changing the position of the plane of the grid. The limitations of the method are pointed out. The possibility of using gratings (12 to 40 lpmm) is considered, as well as the advantages of using moire to analyze the displacements. (Author)

AD-A087 017/0 PC **A03**/MF **A01**
George Washington Univ Washington DC Dept of Civil Mechanical and Environmental Engineering
Nonlinear Creep Buckling Analysis of Initially Imperfect Shallow Spherical Shells,
Robert Kao. Jul 80, 50p
Contract N00014-75-C-0946

Creep buckling times and creep deformations are obtained for axisymmetric shallow spherical shells with and without initial imperfections. For nonlinear creeps, both strain-hardening and time-hardening rules are employed in the analysis; results indicate that strain-hardening yields better estimates of shell life than time-hardening. Results also show that the initial imperfection plays an important role in shortening shell creep buckling times. (Author)

AD-A087 042/8 PC **A04**/MF **A01**
Texas A and M Univ College Station Dept of Aerospace Engineering
The Prediction of Response of Solids to Thermal Loading Using the Finite Element Code AGGIE I.
Technical rept.,
David H. Allen, and Walter E. Haisler. 30 May 80, 53p Rept no. TR-3275-80-1
Contract N00014-76-C-0150

In previous work the authors have proposed a theory of predicting the response of elastic-plastic solids subjected to thermal loads. The theory was cast in a finite element framework and has now been placed in the finite element code AGGIE I. In this paper several example problems will be compared to experimental and other theoretical results. It will be shown that the model in its current form is adequate for modelling the response of many solids composed of temperature dependent materials. (Author)

AD-A087 074/1 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
A Three-Dimensional Stability Analysis/Design Program (3DSAD). Report 1. General Geometry Module.
Instruction rept.,
Fred T. Tracy. Jun 80, 47p Rept no. WES-INSTRUCTION-K-80-4

This module of the three-dimensional stability analysis/design program (3DSAD) enables the engineer to describe the geometry of a three-dimensional structure, to interactively plot the desired structure, and then to obtain volume, weight, and centroid information for the structure. The general ways in which geometry is described are (a) two-dimensional cross sections extended in the third dimension, (b) eight-node brick elements, and (c) clusters of planar polygonal patches. Curved segments can be either circular, elliptical, or quadratic. Hidden lines in a view can be either deleted or dashed. (Author)

AD-A087 225/9 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Center for the Advancement of Computational Mechanics
Efficient Computational Techniques for the Analysis of some Problems of Fracture in Pressure Vessels and Piping.
Technical rept.,
T. Nishioka, and Satya N. Atluri. Jun 80, 30p
Rept nos. GIT-CACM-SNA-20, TR-4
Contract N00014-78-C-0636

Results of (i) a numerical investigation, based on an energy consistent moving-singularity dynamic finite element procedure, of fast crack propagation in a finite plate; (ii) numerical simulation of experimental data on fast crack propagation and arrest in a double-cantilever-beam specimen; and (iii) stress-intensity factor solutions in a thermally shocked cylindrical vessel containing an inner surface (meridional) elliptical flaw, are presented. Comparison of these results with other available solutions, and pertinent discussions, are included. (Author)

AD-A087 226/7 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta Center for the Advancement of Computational Mechanics
Dynamic Fracture Analysis: a Translating - Singularity Finite Element Procedure.
Technical rept.,
Satya N. Atluri, and T. Nishioka. Jun 80, 10p
Rept nos. GIT-CACM-SNA-22, TR-6
Contract N00014-78-C-0636

In this paper an efficient finite element method, which accounts for the translating singularities near the tip of a dynamically propagating crack, is presented. Two aspects of analyses of dynamic fracture, namely, (1) determination of dynamic stress-intensity factors from given crack velocity history; and (2) determination of crack-velocity history (and arrest) from given dynamic-fracture-toughness versus crack-velocity data are considered. Results are presented and discussed for wedge-loaded rectangular, as well as tapered, double-centilever beam specimens. (Author)

AD-A087 227/5 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta Center for the Advancement of Computational Mechanics
New General and Complementary Energy Theorems, Finite Strain, Rate-Sensitive Inelasticity, and Finite Elements: Some Computational Studies.
Technical rept.,
Satya N. Atluri, and H. Murakawa. Jun 80, 20p
Rept nos. GIT-CACM-SNA-23, TR-7
Contract N00014-78-C-0636

General variational theorems for the rate problems of rate-dependent finite strain inelasticity, in terms of the appropriate rates of the first and second Piola-Kirchhoff stress tensors, the symmetrized Biot-Lure' stress tensor, and their conjugate measures of strain-rate are discussed. Certain new rate-complementary-energy principles, involving the

rate of spin and the rate of the symmetrized Biot-Lure' stress tensor as variables, are stated for finite strain analysis of rate-sensitive materials, such as those exhibiting elasto-visco-plastic and creep behavior. Uniqueness and stability criteria for those inelastic solids, using the finite element counterparts of the new complementary energy rate principles, are discussed. Computational studies, using the complementary energy methods, discussed herein incude: (i) bifurcation necking and post-buckling analyses of initially perfect elasto-plastic bars and (ii) post-buckling and large-deformation analyses of thin elastic plates under in-plane compression and transverse bending loads. (Author)

AD-A087 228/3 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Center for the Advancement of Computational Mechanics
Numerical Modeling of Dynamic Crack Propagation in Finite Bodies, by Moving Singular Elements. Part II. Results.
Technical rept.,
T. Nishioka, and Satya N. Atluri. Jun 80, 29p
Rept nos. GIT-CACM-SNA-25, TR-9
Contract N00014-78-C-0636
See also Part 1, AD-a87 395.

Using the moving-singularity finite element method described in Part I of this paper, several problems of dynamic crack propagation in finite bodies have been analysed. Discussions of the effects of wave interactions on the dynamic stress-intensity factors are presented. The obtained numerical results are compared with the corresponding infinite domain solutions and other available numerical solutions for finite domains. (Author)

AD-A087 244/0 PC **A02**/MF **A01**
Old Dominion Univ Norfolk VA Dept of Mathematics
Fracture Problems in Power Law Viscoelastic Materials.
Final rept. 1 Jun 79-30 Jun 80,
Arje Nachman. Jun 80, 25p AFOSR-TR-80-0562
Contract F49620-79-C-0076

Two papers were completed during the contract year. They are appended to this report. The first has been accepted for publication the International Journal of Solids and Structures. The second has recently been submitted to the same journal. Both papers concern themselves with the general issue of debonding. In each paper loading criteria were exhibited under which an interface edge crack between dissimilar elastic media would propogate. It was felt that these questions must be settled for the elastic case before an intelligent approach to the viscoelastic case could be possible. Moreover, several very interesting viscoelastic debonding problems have recently been formulated by the author, so the general program outlined in the contract will be carried forward. (Author)

AD-A087 395/0 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Center for the Advancement of Computational Mechanics
Numerical Modeling of Dynamic Propagation in Finite Bodies, by Moving Singular Elements. Part I. Formulation.
Interim rept.,
T. Nishioka, and S. N. Atluri. Jun 80, 28p Rept nos. GIT-CACM-SNA-24, TR-8
Contract N00014-78-C-0636
See also Part 2, AD-A087 228.

An efficient numerical (finite element) method is presented for the dynamic analysis of rapidly propagating cracks in finite bodies, of arbitrary shape, wherein linear-elastic material behavior and two-dimensional conditions prevail. Procedures to embed analytical asymptotic solutions for singularities in stresses/strains near the propagating crack-tip, to account for the spatial movement of these singularities along with the crack-tip, and to directly compute the dynamic stress-intensity factor, are presented.

AD-A087 423/0 PC **A03**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
STINT/CD: A Stand-Alone Explicit Time Integration Package for Structural Dynamics Analysis.
Technical rept.,
Phillip G. Underwood, and K. C. Park. Jun 80, 45p Rept no. LMSC/D770637
Contract N00014-74-C-0355

This paper is a user's guide for the stand-alone explicit direct time integration package STINT/CD for structural dynamics analysis. STINT/CD uses an automatic variable time increment central difference method. The purpose, function, limitations, and usage of the package are described. A FORTRAN listing of STINT/CD is given along with a sample problem which illustrates its usage and performance. (Author)

AD-A087 440/4 MF **A01**
Systems Research Labs Inc Dayton OH
Two Dimensional Linear Elastic Analysis of Fracture Specimens User's Manual of a Finite Element Computer Program.
Final rept. Jun-Aug 79,
Jalees Ahmad. Feb 80, 116p AFWAL-TR-80-4008
Contract F33615-79-C-5025
Availability: Microfiche copies only.

A Finite Element code for plane stress and plane strain linear elastic analysis of fatigue-crack-growth test specimen configurations was developed. A user's manual for the above code along with user's manuals, for a mesh plotting program, and mesh generating programs for compact, three-point-bend, and ring specimen geometries is provided. Numerical examples for several specimen geometries are also included. (Author)

20L. Solid-State Physics

AD-A086 892/7 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Nb3Al Thin-Film Synthesis by Electron-Beam Coevaporation,
J. Kwo, R. H. Hammond, and T. H. Geballe. 22 Oct 79, 9p GL-3062, AFOSR-TR-80-0530
Contract F49620-78-C-0009
Pub. in Jnl. of Applied Physics, v51 n3 p1726-1732 Mar 80.

No abstract available.

AD-A086 908/1 PC **A02**/MF **A01**
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Velocity of Surface Carriers in Inversion Layers on Silicon,
R. W. Coen, and R. S. Muller. 2 Jun 78, 7p AFOSR-TR-80-0525
Contract F44620-76-C-0100, Grant NSF-ENG76-21818
Pub. in Solid-State Electronics, v23 p35-40 1980.

No abstract available.

AD-A086 910/7 PC **A02**/MF **A01**
State Univ of New York At Stony Brook Dept of Physics
Current-Voltage Characteristics of Interacting Josephson Junctions.
Technical rept. 1 May 79-30 Apr 80,
A. K. Jain, James E. Lukens, Kin Li, R. D. Sandell, and C. Varmazis. 18 Jun 80, 8p
Contract N00014-75-C-0769
Pub. in Inhomogeneous Superconductors, 1979, AIP Conference Proceedings, n58 p265 1980.

No abstract available.

AD-A086 927/1 PC **A02**/MF **A01**
California Univ Santa Barbara Dept of Electrical and Computer Engineering
On the (110) Orientation as the Preferred Orientation for the Molecular Beam Epitaxial Growth of GaAs on Ge, GaP on Si, and Similar Zincblende-on-Diamond Systems,
Herbert Kroemer, Kenneth J. Polasko, and Steve C. Wright. 24 Jan 80, 5p
Contracts N00014-77-C-0430, DAAG29-77-C-0041
Pub. in Applied Physics Letters, v36 n9 p763-765, 1 May 80.

No abstract available.

AD-A086 929/7 PC **A02**/MF **A01**
State Univ of New York At Stony Brook Dept of Physics
Measurement of the Size Dependence of the Current Phase Relation in Microbridge Josephson Junctions.
Rept. for 1 May 79-30 Apr 80,
S. S. Pei, J. E. Lukens, and R. D. Sandell. 30 Jul 79, 4p
Contract N00014-75-C-0769
Pub. in Applied Physics Letters, v36 n1 p88-90, 1 Jan 80.

No abstract available.

AD-A087 102/0 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Dept of Chemistry
Organic Metals and Semiconductors: The Chemistry of Polyacetylene, (CH)x, and its Derivatives.
Technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 21 Oct 79, 14p Rept no. TR-79-8
Contract N00014-75-C-0962
Presented at Advanced Study Inst. on the Physics and Chemistry of Low Dimensional Solids, Aug 79, Tomar (Portugal).

Both cis- and trans-forms of polyacetylene, (CH)(x), may prepared as silvery, flexible polycrystalline, semiconducting films. The cis-films can be stretched to over three times their original length with partial alignment of the (CH)(x) fibrils. Through chemical or electrochemical doping, the electrical conductivity of the films can be increased over twelve orders of magnitude with properties ranging from insulator to semiconductor to metal. By the use of donors or acceptors, n-type or p-type polymer, respectively, is produced. Photoelectrochemical photovoltaic cells have been fabricated using (CH)(x) as the active photoelectrode.

AD-A087 125/1 PC **A03**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Superconducting Tunneling and Tunneling Applications in High Tc A15 Superconductors.
Final rept.,
M. R. Beasley. May 80, 39p Rept no. GL-3133
Contract N00014-77-C-0439

This program was an outgrowth of our early empirical successes in forming superconducting tunnel junctions on thin films of the high transition temperature superconductors, specifically those in the so-called A15 class such as Nb3Sn (T(c) approx. 18 K) and V3Si (T(c) approx. 16 K). Prior to this all attempts at tunneling in the A15 superconductors had been on bulk material and were not widely successful. Moreover such non-thin film junctions are of limited device interest. As a result of this program we now have general junction formation techniques, apparently suitable for the A15 superconductors as a class, which are being routinely used for material diagnostics and for studies of the superconducting properties of these materials. More importantly, perhaps, they appear to have important device potential. We summarized only the main results and conclusions, referring the reader to the appendix for a more comprehensive discussion.

AD-A087 448/7 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Applied and Engineering Physics
Fabrication of Josephson Tunnel Junctions by Reactive Ion Milling.
Technical rept.,
Alan W. Kleinsasser, and Robert A. Buhrman. 21 Jul 80, 12p Rept no. 80-3
Contract N00014-76-C-0526

A new technique has been developed for growing high quality, ultrathin oxide layers on metal films, suitable for use as tunneling barriers in Josephson junction devices. The oxides are produced with an argon-oxygen ion beam, and the rate of growth is determined by the competition between oxidation and sputtering by the ions. The oxidation technique has been applied to the fabrication of high current density submicron niobium-lead alloy Josephson junctions. High quality junctions have been produced with critical current densities exceeding 100,000 amp/sq cm and having low leakage currents at voltages below the energy gap. An

edge geometry has been developed, allowing in-line junctions to be formed on the ion mill-patterned edge of Nb film. In this way, junction width is controlled by the Nb film thickness. (Author)

AD-A087 449/5 PC **A02**/MF **A01**
Cornell Univ Ithaca NY School of Applied and Engineering Physics
High Quality Submicron Niobium Tunnel Junctions with Reactive Ion Beam Oxidation.
Technical rept.,
Alan W. Kleinsasser, and Robert A. Buhrman. 22 Jul 80, 15p Rept no. 80-4
Contract N00014-76-C-0526

A new reactive ion beam oxidation technique has been applied to the fabrication of rugged, high quality niobium-lead alloy Josephson tunnel junctions. Control of critical current density over a wide range is possible, and critical current densities exceeding 1 million amp/sq cm have been obtained. In addition, a process-compatible edge geometry has been developed which allows a junction to be formed on the faceted edge of a niobium base electrode, yielding devices with areas of 10 to the minus 9th power sq cm using 1 micrometer photolithography. (Author)

INIS-mf-5228 MF **A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
Phase Transitions in KCN.
J. C. de Castro Neto. 1977, 63p
In Portuguese.Thesis.
U.S. Sales Only. Microfiche copies only.

The phase transformations in potassium cyanide crystals (KCN) at 168 exp 0 K and 83 exp 0 K and in KCN-KCl mixed crystals, were studied through the i-r optical absorption of the CN exp - stretching mode and the OCN exp - impurity bending mode and Fermi resonance application of uniaxial stress in KCN-KCl mixed crystals gives, by the first time, oriented single crystals in the lower temperature phases. The dichroic optical absorption of the CN exp - stretching mode in these oriented single crystals allowed the explicit determination of the structural arrangement of the CN exp - dipole. The results of our measurements are not in agreement with those recently proposed by Julian and Luety based on electrical experiments with polidomain crystals. The bending mode and Fermi resonances of the substitutional OCN exp - impurity give further information in agreement with previous specif heat measurements. The evolution of the phase transformation was studied as a function of the spheroidal Cl exp - ion concentration replacing the CN exp - ellipsoidal ion. A model for the lower temperature phase is proposed with antiferroelectric ordering of the CN exp - dipoles and additional distortion on positive and negative sub lattices. (Atomindex citation 10:481081)

LYCEN-7841 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Interpretation of Crystal-Field Parameters with Additive Models.
M. Kibler, G. Grenet, and R. Chatterjee. Jun 78, 9p
U.S. Sales Only.

Effective parameters adapted to a chain of groups are defined. They are composed of the isotropic as well as anisotropic spin-orbit parameters and the crystal-field parameters. The crystal-field parameters are discussed in the framework of additive models. Special emphasis is put on the angular overlap model. (Atomindex citation 10:480991)

LYCEN-7847 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Photoemission Spectra of CoO: Crystal-Field Analyses of the Valence Band Structure.
G. Grenet, Y. Jugnet, M. D. Tran, and M. Kibler. 1978, 12p
U.S. Sales Only.

The valence band structure of CoO deduced from x-ray and ultraviolet photoemission spectroscopy is described in the framework of crystal-field theory. The energy of the transitions from the ground state of CO exp 2+ to all states of CO exp 3+ as well as the corresponding relative intensities are determined by taking, for the first time, strong-field configuration interaction into account. (Atomindex citation 10:481097)

20M. Thermodynamics

AD-A086 999/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Gas Channel Formation Studies Including Real-Air Thermodynamic Properties.
Memorandum rept.,
Selig Kainer, and Martin Lampe. 26 Jun 80, 31p
NRL-MR-4247, AD-E000 490
ARPA Order-3718

Real-air thermodynamic properties are included in studies of reduced density channel formation by expansion of a heated cylinder of air. A model for density profile at late times, previously given for a polytropic ideal gas, is extended to the present case. It is shown that a relation between pressure P, density rho, and specific energy epsilon, of the form properties. The variation of f with epsilon, i.e. of specific heat with temperature, can strongly modify the initial pressure profile associated with a given energy density profile. The effects of real-gas thermodynamics during the hydrodynamic expansion, on the other hand, are rather weak. (Author)

AD-A087 434/7 MF **A01**
University of Southern California Los Angeles Systems Management Center
Development of the Microwave Radiative Transfer Program for Cloudy Atmospheres: Applications to DMSP SSM/T Channels.
Final rept. 1 Jun 78-30 Sep 79,
Kuo-Nan Liou, Paul T. Nipko, Grant C. AufderHaar, and Hwa-Young Yeh. 30 Dec 79, 126p AFGL-TR-80-0051
Contract F19628-78-C-0144
Availability: Microfiche copies only.

A microwave radiative transfer program for cloudy and precipitating atmospheres applicable to the DMSP SSM/T channels has been developed. The microwave transfer program takes into account the simultaneous contributions of multiple scattering and absorption by hydrometeors and absorption due to molecular oxygen and water vapor in the atmosphere. Sensitivity analyses have been carried out to investigate the effects of the rainfall rate, cloud thickness, and cloud location on the upwelling brightness temperature over land and ocean surfaces for two different atmospheric profiles. Over the land surface, it is shown that increasing the cloud liquid water content and cloud thickness significantly reduces the brightness temperatures for SSM/T channels 1 - 3. Over the ocean surface, however, the brightness temperatures for channels 1 - 3 are increased as the cloud liquid water content increases and reach to maximum values depending on the cloud thickness involved. Moreover, we show the importance of the cloud position and the atmospheric temperature profile on the brightness temperature values. In addition, investigation of the effects of precipitation on the temperature retrieval using both the theoretically simulated values and real SSM/T data has also been carried out on the basis of a statistical method. The hypothetical retrieval experiments reveal that the temperatures close to the surface suffer increased degradation as the rainfall rate increases. This finding is further supported by the analysis employing the real SSM/T data for a number of case studies in which temperature profiles from radiosondes are available for comparisons. (Author)

20N. Wave Propagation

AD-A086 906/5 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Contribution of Electron-Electron Normal Scattering Processes to the Electrical Resistivity of Thin Wires.
J. E. Black. 29 Oct 79, 9p AFOSR-TR-80-0529
Grant F49620-78-C-0019
Pub. in Physical Review B, v21 n8 p3279-3286, 15 Apr 80.

No abstract available.

AD-A087 203/6 PC **A05**/MF **A01**
Kentucky Univ Lexington Dept of Electrical Engineering
An Experimental Investigation of the King Surface Current Probing Technique in a Transient Application.
Electromagnetics research rept. 1 Jan 78-1 Dec 79,
L. Wilson Pearson, and Youn M. Lee. Dec 79, 90p Rept no. RR-79-4
Contract N00014-77-C-0362

An experimental technique to measure transient surface currents of a scatterer using a King-type semicircular miniature probe is reported. The principal extension of the King technique is the use of the loop probe in transient currents measurement. The transient characteristics of the probe are considered based on the Whiteside theory (29) for the loop. The probes fabricated were subjected to transient excitation in a coaxial calibration jig. Their frequency responses were determined by Fourier transforming their output and deconvolving the excitation spectrum. The agreement between the measured results and the Whiteside theory is observed and evaluated. The probe geometry was tested in an application context, namely, the probing of current on a cylindrical scatterer. The induced surface currents were measured using the probe along the scatterer, and deconvolution of the probe transfer function was carried out subsequently. The deconvolved waveforms are reported and the results of numerical predictions by way of a time domain integral equation technique are reported for comparison. The application goal for this work lies in the numerical extraction of the Singularity Expansion Method (SEM) description of scattering from a given object, using measured transient data.

AD-A087 255/6 PC **A05**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Study of ELF Propagation Anomalies as Related to Improved Knowledge of Electron Density Profiles Produced by Energetic Particle Precipitation.
Annual technical rept. for period ending 30 Nov 79,
William L. Imhof, Robert C. Gunton, Trygve R. Larsen, Joseph B. Reagan, and Edward E. Gaines. 30 Jan 80, 91p Rept no. LMSC/D681778
Contract N00014-79-C-0175

A study has been made of extremely low frequency (ELF) wave propagation anomalies as related to energetic particle precipitation, principally during solar particle events (SPE). Based on calculation of the predicted signal strengths at Tromso for transmissions from the Wisconsin Test Facility (WTF) a criterion has been selected for possible use in a field test operation. If the ion pair production rates at 40 km are equal to or greater than 1 x 1000/cc/sec then it is probable that a 3 dB or larger reduction in signal strength would occur for such an event. Since this preliminary criterion is based on ELF signal strength computation assuming no local time variations along the propagation path, more detailed calculations of the local time ionospheric effects should be performed. A study was made of the expected effect of local time variations during solar particle events on the ELF propagation over the path from WTF to Tromso. Electron and ion density profiles for the various segments of the test path were calculated with the ion chemistry model, taking into account the local time for each segment. In a comparison of conditions measured and calculated for SPE72 on 4 August 1972 near the peak of the event and conditions measured and calculated for a similar case assuming a season of 21 December, very little difference in signal strength attenuation over the path was found.

AD-A087 256/4 PC **A03**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Comparison of Radar Derived Rain Attenuation with the COMSTAR Beacon at 28.56 GHz for Summer and Winter Periods,
Julius Goldhirsh. Jul 79, 39p Rept no. APL/JHU-SIR79U-016
Contract N00024-78-C-5384

A description of new results is given pertaining to an experiment whose aims are to test and improve the accuracy of radar derived slant path rain attenuation methods. These estimated results are compared with measured rain fade levels of the COMSTAR beacon signal at 28.56 GHz at Wallops Island, Virginia. The new data base corresponds to five rain days flanking the winter of 1978-79 during which 715 minutes of simultaneous radar and disdrometer data were obtained. Agreement between estimated and measured individual rain fade events was found to be generally good. Agreement between corresponding conditional cumulative fade distributions was excellent. As a basis for comparison with measured drop size spectra cases, the Marshall-Palmer distribution was injected into the radar program and found to give similarly good results for this data base. This result is consistent with the application of the Marshall-Palmer distribution for stratiform type rains as is generally the rain type for winter periods. (Author)

AD-A087 402/4 PC **A04**/MF **A01**
McDonnell Douglas Research Labs St Louis MO
Radiation and Scattering from Bodies of Translation. Volume I.
Final technical rept. 26 Sep 77-26 Jul 79,
L. N. Medgyesi-Mitschang. Apr 80, 66p RADC-TR-80-142-VOL-1
Contract F30602-77-C-0233
See also Volume 2, AD-A087 403.

An analytical formulation, based on the method of moments (MM) is described for solving electromagnetic problems associated with finite-length cylinders of arbitrary cross section, denoted in this report as bodies of translation (BOT). This class of bodies can be used to model structures with noncircular cross sections such as wings, fins, and aircraft fuselages. The theoretical development parallels in part the MM formulation developed earlier by Mautz and Harrington for bodies of revolution (BOR). Like the latter approach, a modal expansion is used to describe the unknown surface currents on the BOT. The present analysis has been developed to treat the far-field radiation and scattering from a BOT excited by active antennas or illuminated by a plane wave of arbitrary polarization and angle of incidence. in addition, the electric and magnetic near-field components are determined in the vicinity of active and passive apertures (slots). Using the Schelkunoff equivalence theorem, the aperture-coupled fields within a BOT are also obtained. The formulation has been implemented by a computer algorithm and validated using accepted data in the literature.

AD-A087 403/2 MF **A01**
McDonnell Douglas Research Labs St Louis MO
Radiation and Scattering from Bodies of Translation. Volume II. User's Manual. Computer Program Documentation.
Final technical rept. 26 Sep 77-26 Jul 79,
L. N. Medgyesi-Mitschang, and J. M. Putnam. Apr 80, 126p RADC-TR-80-142-VOL-2
Contract F30602-77-C-0233
See also Volume 1, AD-A087 402.
Availability: Microfiche copies only.

A hierarchy of computer programs implementing the method of moments for bodies of translation (MM/BOT) is described. The algorithm treats the far-field radiation and scattering from finite-length open cylinders of arbitrary cross section as well as the near fields and aperture-coupled fields for rectangular apertures on such bodies. The theoretical development underlying the algorithm is described in Volume I. The structure of the computer algorithm is such that no a priori knowledge of the method of moments technique or detailed FORTRAN experience are presupposed for the user. A set of carefully drawn example problems illustrates all the options of the algorithm. For more detailed understanding of the workings of the codes, special cross referencing to the equations in Volume I is provided. For additional clarity, comment statements are liberally interspersed in the code listings, summarized in the present volume.

AD-A087 404/0 MF **A01**
Naval Ocean Systems Center San Diego CA
Equatorial Scintillation of Satellite Signals at uhf and L-band for Two Different Elevation Angles.
Technical rept. 1 Jan 79-1 May 80,
M. R. Paulson. 1 May 80, 182p Rept no. NOSC/TR-543
Availability: Microfiche copies only.

An investigation of the equatorial scintillation of satellite signals at uhf and L-band for 10-and 50-degree elevation angles is reported. diurnal and seasonal variations of scintillation, as well as solar cycle dependence, are given. The occurrence and intensity of scintillations are compared for the two frequencies and for the two elevation angles. A number of fade duration distributions for fades greater than 6 and greater than 12 dB below the undisturbed signal are shown for each frequency and each satellite. A periodicity in the occurrence of scintillation is reported and is attributed to the gravitation field of the moon. It is proposed that the moon's gravity affects the occurrence and intensity of equatorial scintillation by modulating the velocity of the zonal winds at ionospheric heights. (Author)

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A087 183/0 Not available NTIS
California Univ Berkeley Dept of Mathematics
Flame Advection and Propagation Algorithms,
Alexandre Joel Chorin. 16 Mar 79, 11p
Contracts N00014-76-C-0316, W-7405-ENG-48
Availability: Pub. in Jnl. of Computational Physics, v35 n1 p1-11, 15 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

21D. Fuels

AD-A087 053/5 PC **A04**/MF **A01**
Institute of Gas Technology Chicago IL
Process Evaluation - Steam Reforming of Diesel Fuel Oil.
Final technical rept. 24 Apr-24 Dec 79 on Phases 1-4,
George A. Jarvi, Ronald M. Bowman, Elias H. Camara, and Anthony L. Lee. 15 Feb 80, 52p
Contract DAAK70-79-C-0048

This project is an evaluation of a proprietary catalyst as a means of steam-reforming diesel fuel oil (Fed. Spec. VV-F-800B, symbol DF-2). A system for testing the catalyst has been designed, built and successfully used to screen operating conditions of temperature, space velocity, and H2O/C ratio. A duration test has been conducted showing the catalyst capable of steam reforming diesel fuel, but with the production of naphthalene after 30 hours. Hydrogen production remained stable through the 86 hours of the test. (Author)

AD-A087 267/1 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Effect of Oxidizing Fuels on Aircraft Fuel System Elastomers and Sealants.
Final rept.,
C. Nadler. 20 May 80, 18p Rept no. NADC-80076-60

Jet fuels containing peroxides resulting from hydrogenation during refining have potential for damaging fuel system elastomeric components. Immersion tests were conducted for 1000 hours between 130 - 165 F in JP-5 containing 1, 5, and 10 meq. peroxide/1000 gm fuel with various fuel system sealants and elastomers. Damage thresholds were indicated and maximum allowable peroxide contents were recommended. (Author)

AD-A087 321/6 PC **A03**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Waste-Oil Boiler Firing Demonstration at Naval Weapon Center China Lake, California.
Final rept. Oct 78-Mar 80,
T. T. Fu, and R. S. Chapler. Jun 80, 32p Rept no. CEL-TN-1580

The waste oil generated at Naval Weapon Center (NWC), China Lake, CA was fired in a 20,000-lb/hr steam boiler at NWC to determine the operational requirements for using it as a boiler fuel. Two series of tests were conducted using blends of this waste oil and commercial grade No. 6 fuel oil normally used for NWC boilers. The first series tested batch-blended oils, while the second series an in-line blending scheme. Six thousand gallons of waste oil was consumed and 440 boiler hours covering the full range of firing conditions were logged during the tests. Results show that the NWC waste oil can be satisfactorily fired either straight or in blends of any concentration with No. 6 fuel oil. Only minor adjustments to firing controls are sometimes required. No operational or environmental emission difficulties were encountered. (Author)

AD-A087 364/6 MF **A01**
Texas Univ At Austin Dept of Chemistry
Photocatalytic Production of Hydrogen from Water and Texas Lignite Using a Platinized Titania Catalyst.
Technical rept. no. 16, 1 Jan-31 Dec 80,
Shinri Sato, and John M. White. 15 Jul 80, 11p
Contract N00014-75-C-0922
Availability: Microfiche copies only.

Using a physical mixture of powdered Texas lignite and platinized titania in the presence of water vapor and ultraviolet light, we show that a catalytic reaction occurs at 23 C to form hydrogen and carbon dioxide. These results are contrasted with a recent electrochemical conversion process. (Author)

PB80-205305 PC **A03**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Survey of Coal Industry Programs for Utilization of Methane from Coal Seams.
Final rept. 31 Mar-31 Oct 79,
David C. Uhrin, F. du Breuil, and R. D. Saltsman. 14 Feb 80, 39p BCR-L-1068, GRI-79/0044
Contract GRI-5010-380-0164

The purpose of this study was to determine the activity in the private sector of the United States regarding removal and utilization of coalbed methane. An attempt was made to learn to what extent and for what purposes coalbed methane is currently being used, what experimental programs exist, and what programs are planned or proposed. Information was obtained primarily from interviews with coal industry personnel familiar with the subject of recovery of methane from coalbeds. Methods presently used or under investigation in the United States for removing methane from coalbeds are briefly described, and factors to consider when planning methane removal are presented. The study identifies various obstacles that must be overcome for methane removal techniques to become routine procedures and for the methane captured to become attractive as a fuel.

PB80-205339 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. LNG Research Center.

Numerical and Physical Experiments in Double-Diffusive Convection: A Lateral Heat Flux Imposed on a Vertical Concentration Gradient.
Final rept. Jan 77-Dec 79,
Kenton A. Griffis, and Kenneth A. Smith. Dec 79, 39p GRI-79/0047
Contract GRI-5010-352-0011

It has been concluded that stratified cells will readily form in an LNG tank as a result of side wall heat leak unless the tank contents are initially very well mixed. Mixing, unless it is very good, only slightly mitigates the long term roll-over potential which is present when LNG is transferred to a tank which already contains an LNG of a different composition. Two mechanisms of cell formation are found to exist and are correlated in terms of a single stability parameter. If a single tank is to be used for the storage of an LNG for which the composition may vary, it is recommended that all LNG transfers be done in a manner to produce excellent mixing. For those circumstances in which strata are formed, perhaps as a result of operator error, it is believed that technical effort should now be directed at the issue of the rates at which heat and mass are transferred between strata.

PB80-205362 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. LNG Research Center.
Boiling of LNG on Typical Dike Floor Materials.
Final rept. Sep 75-Sep 79,
Robert C. Reid. Mar 80, 150p GRI-79/0026
Contract GRI-5014-353-0160

Boiling rates of LNG and liquid methane were measured for various substrates which are or could be used as dike floor materials. These rates were correlated with theoretical heat transfer models to allow interpolation and extrapolation. Two very effective insulations were identified: A proprietary insulating concrete and corrugated metal plates. The former has very low density, is quite strong, and has a low thermal conductivity. The latter is inexpensive, easily placed into position and leads to quite low boiling rates. Also shown was the fact that LNG vaporizing on a solid surface is in vapor-liquid equilibrium and, therefore, standard thermodynamic correlations may be used to estimate the composition of the evolved cloud.

PB80-209125 PC **A06**/MF **A01**
Battelle Columbus Labs., OH. Columbus Labs.
Environmental and Technological Analysis of the Use of Surplus Wood as an Industrial Fuel.
Final rept. Sep 77-Dec 78,
E. H. Hall, J. E. Burch, M. E. Eischen, and R. W. Hale. Jun 80, 107p EPA/600/7-80-102
Grant EPA-R-805050-01-0

The report examines the technology and the environmental aspects of the use of surplus wood as an industrial fuel. It includes a review of various wood-burning technologies and a listing of existing facilities. Information on operational problems obtained through site visits is summarized. Estimates are presented of the reduction of sulfur dioxide emissions achieved by burning wood instead of coal or oil. Industrial fuel requirements are compared with the quantities of unused wood residues available on both regional and national levels. Ecological impacts of wood residue utilization and nontechnical barriers to the use of wood fuel are explored.

PB80-211477 PC **A10**/MF **A01**
Office of Technology Assessment, Washington, DC.
Energy from Biological Processes.
Jul 80, 204p OTA-E-123
See also report dated Jun 78, PB-283 770.

This report was produced in answer to a request by the Senate Committee on Commerce, Science, and Transportation for an evaluation of the energy potential of various sources of plant and animal matter (biomass). Presented are analyses of prominent biomass issues, summaries of four biomass fuel cycles, a description of biomass' place in two plausible energy futures, and discussions of policy options for promoting energy from biomass. The four fuel cycles--wood, alcohol fuels, grasses and crop residues, and animal wastes--were chosen because of their near- to mid-term energy potential and because of the public interest in them.

PB80-813561 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Waste Utilization as an Energy Source, 1974-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Jul 80,
Gerald F. Zollars. Aug 80, 73p
Supersedes NTIS/PS-79/0765. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the processing of solid and organic wastes for use as an energy source. Industrial, agricultural, and residential wastes are considered as sources of both gaseous and liquid fuels such as methane, methanol, ethanol, and synthane. (This updated bibliography contains 322 citations, 103 of which are new entries to the previous edition.)

21E. Jet and Gas Turbine Engines

AD-A086 915/6 PC **A05**/MF **A01**
United Technologies Research Center East Hartford CT
Lightweight Propulsion Systems for Advanced Naval Ship Applications. An Executive Summary,
Simion C. Kuo. Nov 79, 81p Rept no. UTRC/R79-954176-3
Contracts N00014-76-C-0542, N00014-77-C-0735
See also AD-A040 032 and AD-A062 746.

This executive summary report presents the major results of a comprehensive study program to evaluate the technological and economic feasibility of utilizing open- and closed-cycle gas turbines to provide lightweight propulsion power for future Navy surface ship applications. The level of technology considered in this study is that judged by the Contractor to be available during the 1990's. Naval ship types which could benefit from implementing lightweight propulsion systems were identified and characterized, and applicable propulsion system configurations and power levels compatible with component capabilities were selected. Extensive parametric analyses were made of the performance, weight, and cost characteristics for the baseline propulsion systems, from which the total propulsion-system-plus-fuel weight was then estimated. The payload capabilities and endurance limitations with open- and closed-cycle gas turbine propulsion systems for selected ship types are presented.

AD-A087 063/4 PC **E20**/MF **E20**
Johns Hopkins Univ Laurel MD Chemical Propulsion Information Agency
JANNAF Propulsion Meeting (1980), 11-13 March 1980. Naval Postgraduate School, Monterey, California. Volume V.
Meeting papers,
Karen L. Strange. Mar 80, 646p Rept no. CPIA-PUB-315-VOL-5
Contract N00024-78-C-5384
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20810 (No Copies furnished by DTIC).

This volume, the fifth of a seven-volume proceedings, is a collection of unclassified papers presented at the 1980 Joint Army-Navy-NASA-Air Force (JANNAF) Propulsion Meeting, held 11-13 March 1980 in Monterey, California. The subjects discussed cover the broad spectrum of liquid, solid, airbreathing and electric propulsion for tactical, strategic and space applications. Indexes to all the volumes will be published in a separate addendum. (Author)

PATENT-4 124 976 Not available NTIS
Department of the Navy Washington DC
Method for Reducing the Critical Injection Parametric in a Solid Fuel Ramjet.
Patent,
Allen L. Holzman. Filed 5 Jul 77, patented 14 Nov 78, 4p AD-D007 395/7, PAT-APPL-813 044
Supersedes PAT-APPL-813 044-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and system for reducing the critical injection parameter (h/D sub p) in a solid fuel ramjet (SFRJ) by using a low (h/D sub p) fuel within the recirculation region of the grain and a higher (h/D sub p) fuel for the majority of the grain to reduce the injector pressure drop, allow higher chamber pressure and higher performance and achieve flame stabilization. (Author)

PB80-185796 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Analysis of Aircraft Emission Control Parameters.
Technical rept.
Oct 75, 24p EPA-AA-AC-75-02

The impetus for this current analysis of the controlling parameter for aircraft emissions is the ongoing development of international emission regulations through the international Civil Aviation Organization (ICAO). The May 1975 meeting of the Aircraft Engine Emission Study Group (AEESG) of ICAO discussed various approaches to specifying the parameter for controlling aircraft emissions. Appendix A is the record of the meeting pertinent to the controlling parameter. During the May meeting, the viable parameters were narrowed to two basic approaches. Namely, the use of a measure of pollutants normalized by fuel flow and pollutants normalized by thrust or impulse. This report provides an analysis of the merits and disadvantages of these two different approaches.

22.
SPACE TECHNOLOGY

22A. Astronautics

AD-A087 249/9 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Lab Operations
Characteristics of Electrical Discharges on the P78-2 Satellite (SCATHA).
Technical rept.,
Harry C. Koons. 15 Jul 80, 28p TR-0080(5505-02)-2, SD-TR-80-49
Contract F04701-79-C-0080

The P78-2 (SCATHA) satellite was launched on 30 January 1979 to measure the characteristics of the spacecraft charging process near synchronous orbit. A Charging Electrical Effects Analyzer onboard measures the characteristics of electrical discharges in both the frequency and time domain. Pulses are detected in response to commands, during electron and ion beam operations and during natural charging events. (Author)

22B. Spacecraft

AD-A087 390/1 MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
DSCS II. Battery Anomaly Investigation Satellites 9437 and 9438.
Final rept.,
Paul Bauer, and Charles Lurie. 25 Apr 80, 325p TRW-32824-AR-019-01, SD-TR-80-33

SPACE TECHNOLOGY—Field 22

Spacecraft—Group 22B

Contract F04701-77-C-0118
Availability: Microfiche copies only.

This report presents a description of the anomalous behavior of the electric power subsystems of DSCS II Satellites 9437 and 9438, and of the investigations conducted to determine the cause of the anomalies. These investigations include ground test simulations using flight-configuration batteries, component level testing, and analyses of components and systems. The investigations are described and the results discussed. The study concludes that the anomalous behavior was the result of battery cell short circuiting. The cause of the short circuiting is identified as excessive overcharge, its cause and the corrective actions taken are discussed. (Author)

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